August 12, 2019

MEMORANDUM **UTAH DEPARTMENT OF TRANSPORTATION**

TO: Kris Peterson, P.E., Chairman

FROM: Brad Yeates
Recorder, Standards Committee

Brad Yeates
Aug 15 2019 7:27 AM
DocuSign

SUBJECT: Standards Committee Meeting Minutes and Next Meeting

The next meeting has been scheduled for Thursday, August 29, 2019 at **8:30 a.m.**, in the 1st Floor, Redwood A conference room of the Rampton Complex.

All agenda item approval for 2017 Standards only.

Item		**Remarks**	**Sponsor**
1.	Minutes of June 27, 2019	For approval (page 7)	Brad Yeates
2.	Standard Specification 03211, Reinforcing Steel and Welded Wire	For approval (page 19)	James Corney
3.	Standard Specification 01554, Traffic Control	For approval (page 47)	Justin Wilstead
4.	Standard Drawings, TC 6 Series (see listing)	For approval (page 72)	Justin Wilstead
5.	Standard Drawings, BA 1-3 Series (see listing)	For approval (page 84)	Shawn Debenham
6.	Standard Drawings, SL Series (see listing)	For approval (page 130)	Jesse Sweeten
7.	Standard Drawings, ST Related Changes (see listing)	For approval (page 138)	Tiffany Pocock
8.	Standard Specifications, Materials Related (see listing)	For approval (page 172)	Bin Shi
9.	ATMS Standard Drawings and Specification (See listing)	For approval (page 197)	Mike Adams
10.	Review of Assignment/Action Log	For discussion (page 17 & 214)	Brad Yeates
11.	Other Business: a) Review of all editorial changes this cycle.	For discussion a)(page N/A)	Kris Peterson

KP/by
Attachments

12a: Editorial Updates
NONE

Agenda Listing

Item 4	**Justin Wilstead**
TC 06	Temporary Pedestrian Access Route (DELETION)
TC 06A	Temporary Pedestrian Access Route – Ramp Details
TC 06B	Temporary Pedestrian Access Route – Device Details
TC 06C	Temporary Pedestrian Access Route – Diversion
TC 06D	Temporary Pedestrian Access Route – Detour
Item 5	**Shawn Debenham**
BA 1A1	Concrete Barrier General Notes and Standard Details 1 of 2
BA 1D	Concrete Barrier Layout
BA 1E	Concrete Barrier Column Protection
BA 2A	Precast Concrete Barrier – 32 Inch New Jersey Shape
BA 2B	Precast Concrete Barrier – 32 Inch New Jersey Shape, Sloped End Section (For Speeds ≤ 40 MPH)
BA 2C	Precast Concrete Barrier – 32 Inch New Jersey Shape, Median Small Sign Section **(DELETION)**
BA 2D	Cast-In-Place Concrete Barrier – 32 Inch New Jersey Shape, 42 Inch Constant Slope Barrier Transition
BA 2E	Precast Concrete Half Barrier – 32 Inch New Jersey Shape
BA 3A1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 1 of 3
BA 3A2	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 2 of 3
BA 3A4	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 42 Inch
BA 3B	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch Electrical Details
BA 3C1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Sign Structure Foundation Transition 1 of 2
BA 3D	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Median Small Sign Section **(DELETION)**
BA 3E1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, TL-5 1 of 2
BA 3E3	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 42 Inch TL-5
BA 3F1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Bridge Parapet Transition 1 of 3
BA 3F2	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch, Bridge Parapet Transition 2 of 3
BA 3G	Precast Concrete Constant Slope Barrier- 42 Inch
BA 3H	Precast Concrete Constant Slope Barrier- 42 Inch, Sloped End Section (For Speeds ≤ 40 MPH)
BA 3I1	Precast Concrete Constant Slope Barrier- 42 Inch, Median Small Sign Section 1 of 2
BA 3J	Precast Concrete Constant Slope Barrier- 42 Inch, 32 Inch New Jersey Shape Transition
BA 3K1	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch

BA 3K2	Cast-In-Place Concrete Constant Slope Half Barrier with Scuppers - 42 Inch
BA 3K3	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch
BA 3K5	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch Constant Slope, 32 Inch New Jersey Shape Barrier Transition
BA 3L	Precast Concrete Constant Slope Half Barrier- 42 Inch
BA 3M1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 1 of 3
BA 3M2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 2 of 3
BA 3M4	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 54 Inch
BA 3N1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Median Small Sign Section 1 of 2 **(DELETION)**
BA 3N2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Median Small Sign Section 2 of 2 **(DELETION)**
BA 3O1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, TL-5 1 of 3
BA 3O2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, TL-5 2 of 3
BA 3O4	Cast-In-Place Concrete Constant Slope Barrier with Scuppers - 54 Inch, TL-5
BA 3P1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Bridge Parapet Transition 1 of 3
BA 3P2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, Bridge Parapet Transition 2 of 3
BA 3Q1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, 42 Inch Constant Slope Barrier Transition
BA 3Q2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch, 32 Inch New Jersey Shape Barrier Transition

Item 6	**Jesse Sweeten**
SL 6D	Overhead Flashing Beacon at an Intersection Crosswalk
SL 6F	Overhead Flashing Beacon at a Midblock Crosswalk

Item 7	**Tiffany Pocock**
GW 1A	Raised Island
GW 7A	Delineation Application
PA 06	Roundabout, Transit Shelter, and On-Street Parking
RR 06	Pedestrian Controls Street Running Railroad Alignment Signalized Intersections
RR 07	Pedestrian Controls Street Running Railroad Alignment Unsignalized Intersections
SL 6E	Post-Mounted Flashing Beacon at an Intersection Crosswalk
SL 6G	Post-Mounted Flashing Beacon at a Midblock Crosswalk
ST 01	Typical Pavement Markings **(NAME CHANGE)**
ST 02	Passing Lane Detail **(DELETION)**
ST 02	School Crossing and School Message **(NEW DRAWING. Renumbered ST 08)**
ST 03	Contrast Pavement Markings for Concrete Pavement **(NEW DRAWING. Renumbered ST 09)**

ST 03A	Freeway Climbing Lane Inside Widening Detail **(DELETION)**
ST 03B	Freeway Climbing Lane Outside Widening Detail **(DELETION)**
ST 04	Entrance Ramp Pavement Markings **(DELETION)**
ST 05	Exit Ramp Pavement Markings **(DELETION)**
ST 06	Intersection Pavement Markings **(DELETION)**
ST 07	Crosswalks, Parking, and Intersection Approached **(DELETION)**
ST 08	School Crossing and School Message **(DELETION, renumber as ST 2)**
ST 09	Contrast Pavement Markings for Concrete Pavement **(DELETION, Renumber as ST 03)**
ST 10	Bicycle Lane Pavement Markings (Sheet 1 of 2) **(DELETION)**
ST 11	Bicycle Lane Pavement Markings (Sheet 2 of 2) **(DELETION)**
ST 12	Location of Bicycle Detector Pavement Messages at Intersection **(DELETION)**
ST 13	Two-Lane Intersection Pavement Markings (Sheet 1 of 2) **(DELETION)**
ST 14	Two-Lane Intersection Pavement Markings (Sheet 2 of 2) **(DELETION)**
ST 15	Preferential Lane Signing and Pavement Marking Details **(DELETION)**
ST 16	Preferential Lane Access Opening Details **(DELETION)**
ST 17	Preferential Lane Median Signing Spacing Greater 1 Mile **(DELETION)**
ST 18	Preferential Lane Median Signing Spacing Equal to or Less than 1 Mile **(DELETION)**

Item 8	**Bin Shi**
01455	Materials Quality Assurance **(TITLE CHANGE)**
01457	Aggregate Source Control **(NEW SPECIFICATION)**
02753M	Full Depth Slab Replacement for Concrete Pavements
02755M	Concrete Slab Jacking

Item 9	**Michael Adams**
13556M	Closed Circuit Television (CCTV) Assembly
AT 10A	Axis CCTV Mounting Detail and Wiring Diagram
AT 10B	CCTV Mounting Detail and Wiring Diagram
AT 10C	CCTV Mounting Detail and Wiring Diagram **(DELETION)**
AT 10D	Camera Cable Splicing Diagrams **(DELETION)**
AT 10E	CCTV Dip Switch Settings **(DELETION)**
AT 11A	CCTV Pole Mounting Details
AT 11B	Non-Intrusive Detector Mounting Details

cc:

Lisa Wilson Director, Region One	Fred Doehring Central Preconstruction	George Lukes Standards and Design
Bryan Adams Director, Region Two	Cheryl Hersh-Simmons Structures	Brad Yeates Standards
Rob Clayton Director, Region Three	Ken Talbot Construction	Vincent Liu Research
Rick Torgerson Director, Region Four	Scott Andrus Materials	Rob Wight Operations
	Daniel Page Maintenance	Russ Robertson FHWA
	Robert Miles Traffic and Safety	Betty Purdie AGC
	Michael Adams Traffic Management Division	Derek Lahusen ACEC
	Brett Slater Region One, Preconstruction	

June 27, 2019

A regular meeting of the Standards Committee convened at 8:30 am, Thursday, June 27, 2019 in the 1st Floor, John Njord conference room of the Rampton Complex.

Members Present:

Fred Doehring for Kris Peterson	Project Development	Chairman
N/A (Fred Doehring)	Central Preconstruction	Member (V)
George Lukes	Preconstruction and Standards	Member, Secretary (V)
Brad Yeates	Preconstruction, Standards	Member, Recorder (NV)
Rick Torgerson	Region 4, Director	Member (V)
Brett Slater	Region 1, Preconstruction	Member (V)
Ken Talbot	Construction	Member (V)
James Corney for Cheryl Hersh Simmons	Structures	Member (V)
Robert Miles	Traffic and Safety	Member (V)
Scott Andrus	Materials	Member (V)
Michael Adams	TOC	Member (V)
Daniel Page	Maintenance	Member (V)
N/A (Betty Purdie)	AGC	Advisory Member (NV)
Vincent Liu	Research	Advisory Member (NV)
Dave Cox for Russ Robertson	FHWA	Advisory Member (NV)
Derek Lahusen	ACEC	Advisory Member (NV)

V = Voting Member NV = Non-Voting Member

Members Absent:
Kris Peterson
Cheryl Hersh Simmons
Betty Purdie
Russ Robertson

Staff:

Corey Nelson	Traffic and Safety
Rod Hess	Environmental
Robert Stewart	Construction
Chris Whipple	Region 2, Innovative Design

Visitors:
N/A

Standards Committee Meeting

Minutes of the June 27, 2019 meeting:

The meeting agenda package and agenda items were displayed on the large screen.

Use the following listing for the numbered Agenda Item to see the Standards covered by that particular item.

Agenda Listing for February items covered in the following minutes.

Item 7	**Chris Whipple**
BA 1B	Concrete Barrier Median Installation
BA 1C	Concrete Barrier Shoulder Installation
Item 8	**Michael Adams**
13591M	Traffic Monitoring Detector Loop
AT 02	Ramp Meter Signal Head Details
AT 09	ATMS Cabinet and Equipment Disconnect and Transformer Frame
SL 4C	Underground Service Pedestals

Minutes start here.

1. Minutes of February 28, 2019 meeting were approved as presented

   Discussion points were:

   - Fred started by telling everyone he was filling in as Chairman for Kris. Fred asked everyone to introduce themselves.

   - There was no discussion on the minutes.

   Motion: Robert Miles made a motion to approve the minutes as discussed. Seconded by Scott Andrus. Passed unanimously.

2. Standard Specification 00555M, Prosecution and Progress (Agenda Item 2) – Presented by Josh Van Jura.

   Josh presented the change as follows:

   - The only thing that needed to change was to make monthly status of time required for all projects and not just for working day projects. But since I was opening it for that I thought I should also incorporate all the current specials and the two supplementals versions of the spec. I thought it was a good time to put them all together. Putting them altogether brought a lot of

comments. Qualified health that is part of subletting, nighttime work, the partnering supplemental and the stop and suspend. A lot of the comments generated some good discussion that was important to talk through. Did I not answer anyone to their satisfaction? I hope I got them all because I talked to everyone separately about their comments.

Discussion points were:

- There was no further discussion.

Motion: James Corney made a motion to approve the agenda item as presented. Seconded by Scott Andrus. Passed unanimously.

3. Standard Specification 01355M, Environmental Compliance (Agenda Item 3) Presented by Rod Hess.

- Fred gave a brief informational preamble about this agenda item, stating the initial change that was presented for review received some comments that caused some of the changes to be pulled out for reworking, but that in order to be in compliance with the hard deadline to get the remaining changes incorporated due to the signing of the Consent Decree or Agreement with the EPA, we will be moving forward with required changes.

Rod presented the change as follows:

- As Fred said, the language added was to address the requirements of the Consent Decree. Because of the agreement we needed to add the language to address the timing of getting it into projects. That said these changes are very minor but address the language required by the agreement.

- We also added some other items while adding this language, but because of comments, we have pulled those additions to find a better solution to the concepts that were added. We will work on those and bring them back in a future meeting. This language mainly has to do with sweepings. Fred clarified that the language as it is in the current Supplemental Specification will remain, but with the understanding that we know it needs to be rewritten and worked on to provide more clarity. Rod said that we will be collaborating with Betty and some others in the room to work on getting it written so it satisfies all parties and law requirements.

- Rick asked if this was related to the articles dealing with existing pipes being cleaned out. Rod indicated that he was correct. Rod said this issue came up in February as well and they thought they had language that addressed it, but it still wasn't quite right. It has to do with the material that is cleaned out and how to store and dispose of the waste. Fred said the spec says to dispose of properly, but properly isn't defined, and that is the issue. As well as, is there a

cost associated with this process and how do we pay the contractor. Rod said we want to provide enough information also so that the Contractor can provide a more accurate estimate on their bid. George said that a group of us sat down and we all agree that we need to do this, but we don't really have the procedure on how to do it, and that is the part we need to work out. George also said that it isn't clear what some the specifics of how to handle the material aren't defined either. George said that we all agreed that a group of us should work on this, and we'd really like to include a contractor, and he wished Betty had been there so we could get a recommendation on who might be good to include. Rick said it seemed like a pretty big deal and he didn't want it to be forgotten. Rod agreed.

- Ken brought up the reference to the Standards Web Reference page and said he didn't know if that was the right place for it. Rod said that it is in Masterworks and Ken said he understood that a contractor could access it there and fill it out. Ken said that if we make the contractors use the form in Masterworks then all of our region people can easily access the information and data. Rod said that this was written in here to lay out the requirement. How the contractor needs to provide it should reside with construction rather than through this spec. Robert said that we have a general requirement for all contractors to use our business systems. We can enforce it through that.

- George and Robert talked about how we could write this to enforce them using Masterworks. Rod clarified what the form was supposed to provide. Rod said that it needs to say to use the form. That is part of the agreement. We can't take that out. Robert said to just delete the "Refer to the Standards Web Page" sentence. All agreed that this was the best way to handle it.

Motion: Ken Talbot made a motion to approve the agenda item with modification to remove "Refer to Standards Reference Web Page." Seconded by Rick Torgerson. Passed unanimously.

Fred said the previous motion only dealt with the change, and didn't cover the rest of the spec. We will need to have a second motion. Robert Miles made a motion to approve the rest of the specification as presented. Seconded by Ken Talbot. Passed unanimously.

4. Standard Specification 02701, Pavement Smoothness (Agenda Item 4) Presented by Jason Simmons.

Jason presented the change as follows:

- 02701 was created as a 2017 standard after being used as a Special Provision on only a couple of trial projects. After being in use for a year, input on the specification was gathered, data was gathered and we discussed it with industry and now we are updating it. Most of the changes clarify the

intent of the standard specification. Some additional requirements were also added to improve the process and enforcement of the specification.

- Many of the comments were on 02742S and we have kept a lot the tables in there rather than moving them into 02701. We wanted them in 02742S so we can continue to make some adjustments and refine our process. Ideally we'd like to have everything in 02701, but I think it is going to be a couple more years until we have enough data and refinement of what we are doing to make all of this a Standard process.

- Scott said that industry has understood from the beginning that this is going to be an evolutionary process and they had a lot of concerns initially because we were asking them to jump and change quite a bit. But keeping a lot of this information in the Special allows us to make adjustments.

Discussion points were:

- James said that he found that taking the definitions out of the spec and put in the special is confusing. He said that we use those words a lot but there is nowhere in the spec book where you can find the definition. Jason said the reason they did that is that the definitions change based on the project. He said that they want to gather more data before they define any of them as standard. When these concepts were introduced for 2017 we knew nothing and took a leap forward. We just aren't comfortable yet to make any of them standard.

- James said he had another comment that is actually based on Ray's comment on the Comment Form about the special. In Comment #24 Ray said: For consistency, use either 0.1 mile or 528 feet in all cases. Move E4 to after calculation of incentive/disincentive (E7). E7a 1 and 2 are redundant with the tables and should be deleted.

  The response is that it isn't redundant and is necessary. Jason explained that this is for category 2 and gave an example of how it works. James said that his disconnect was that Tables 1 and 2 don't apply to the striping. Jason said that was correct and that it goes under the percent improvement clause which applies to the other table.

- Fred said that he had a concern with the number of comments that AGC and Betty had. He wished she were here to say she accepts your replies. Have you talked to Betty? Jason said he had not. He sent everything over to her, but she didn't reply. Scott said Jason has had a lot of conversations with UAPA and the asphalt people. Jason said that they are okay. Jason said that in Betty's comments they are worried about design roughness that is giving them a hard time. Jason said quite frankly I don't see it. There were a couple of ramps on I-215 that had that issue but I don't see that as a general

problem. That will be more of a case by case basis and I struggle to change the specification based on those kinds of cases. Chris said that Betty ran into this issue on I-15 and said that is probably why she brought it up. Fred said that it seems like she had some questions about some of the procedural items as well. Jason said that she did and that he changed or took out some of the requirements she commented on.

- George asked what the intent was based on Betty's comment 34: Why is a list of all grinding with stations required to be submitted? This will cause project delays, additional TC impacts, and grinding is often adjusted as you go to resolve both the MRI and IRI issues.
  George said based on your response, is this going to be an approval? Because it looks like there is a need for the engineer to approve what should and shouldn't be ground. Jason said that the contractor decides where to grind. Jason said that what we would like is a heads up to say I am going to go out and grind these areas. I want the RE to be able to tell the contractor if they are going to take a disincentive for the grind. Scott said we would have this conversation before or after the grind. It will be a lot harder after. George asked if this puts us in a position where if the RE or inspector doesn't have a conversation before, it becomes an issue? Robert said he liked the way it was written before where we received something and had 24 hours to make a decision. Robert said he could see a project with a lot of grinding having quite a bit of contentious conversations. Jason said a project should have a grinding plan and that can change. He said that it is those changes that he doesn't want to slow down. We just want that information so we can have a conversation before they grind. James asked out it is worded currently. Jason said there is no grinding in there currently.

- A few side conversations took place. After some discussion everyone realized that the grinding wasn't in the original spec, and that after Betty's comments Jason took it out of the proposed Supplemental. So there is no grinding in the spec. Jason said it would be nice to have it in there.

- Jason brought up an issue about GPS. They shouldn't be used until 2020. Everyone agreed it was just an instructional issue and there was no need to add the date to the spec. Any issues with it could be handled on a case by case basis. Scott said it probably wouldn't effect very many projects.

Motion: Scott Andrus made a motion to approve the agenda item as presented. Seconded by Robert Miles. Approved unanimously.

5. Standard Specification 02983, Grinding for Grooved-in Pavement Markings (NEW SPECIFICATION) (Agenda Item 5) – Presented by Chris Whipple.

Chris presented the change as follows:

- This was submitted in February and we were asked to go back and do a little work on. This was a region special. And each region had their own special. This was an effort by the Statewide design group to put together one document to be used by everyone.

Discussion points were:

- There was no further discussion.

Motion: Danny Page made a motion to approve the agenda item as presented. Seconded by Mike Adams. Passed unanimously.

6. Standard Drawing SL 06A, Pedestrian Signal Assembly (Agenda Item 6) – Presented by Chris Whipple.

Chris presented the change as follows:

- This was also submitted for February. In an effort to make sure we are doing the right thing, we went back and did some more work on this based on the MUTCD and recommendations from this Committee. We worked with FHWA and a few key people in design, Traffic and Safety, and Pre-Construction to make this update.

Discussion points were:

- James said in February you went to a lot of work to create the corner detail and after that was rejected, is there a reason you don't go back to what it was previously? Chris said that one of the figures was removed to the Design drawings. The reason there is a blank spot is that the two drawings are in the same file, but that for the Standard Drawing that detail is turned off, however this same drawing is in the Roadway Design Manual and that detail would be turned on. James asked if they are using the same file twice. George detailed some of the concepts behind avoiding "sister drawings" and the ability to keep all drawing information, both Standard and design, in the same file.

- James and Robert pointed out that one of the Note Call outs needed to be updated. Note 7 callout need to be removed.

Motion: Robert Miles made a motion to approve the agenda item with modification to correct Note 7 callout. Seconded by Rick Torgerson. Approved unanimously.

7. Standard Drawings BA 1B and BA 1C, (See listing) (Agenda Item 7) – Presented by Chris Whipple.

Chris presented the change as follows:

- Again, another item submitted in February that we were asked to go back and do some further work on. There is some ambiguity in the current drawing with regard to the narrow space between the edge of pavement and the barrier pad; it currently allows compacted base material as an option that then becomes the default. After talking with Maintenance and Drainage, this spot is a potential erosion issue. To remedy that issue, we proposed to extend the pavement or barrier pad to a maximum of 4-foot width and thereafter use compacted base material.
  These changes were proposed previously, but we were asked to add a detail to better explain the note that was added. That detail has been added.

Discussion points were:

- Robert Miles asked how the contractor accounts for this additional work. Chris said that it goes under Concrete Flat Work. Fred asked if it should be included as part of the pad. Chris said that it isn't part of the pad. Robert said if it is HMA, then they just add additional quantity of asphalt. Chris said that was correct.

- There was no further discussion.

Motion: Danny Page made a motion to approve the agenda item as presented. Seconded by Robert Miles. Passed unanimously.

8. Standard Drawings and Specification, ATMS Related (see listing) (Agenda Item 8) – Presented by Michael Adams.

Mike presented the change as follows:

- Just a quick rundown of what we changed:
  On AT 2 we revised drawing cross references in Note 3 and Note 4 to match the correct SL Series Standard Drawing, and deleted Note 7 and added dimension to signal head height above road surface.
  On AT 9 we updated Detail B by deleting the conduit size requirement (2") GRC Conduit between the Disconnect and Transformer. Is was decided that the Electrical Engineer should specify the size of conduit based on his electrical load calculations. For example, the electrical engineer selects a

disconnect switch and transformer based on load. Next, the supplier issues the disconnect switch and transformer and a 2” conduit won’t fit into the sides of the electrical boxes correctly. Then, the solution would be use a 1-1/2” conduit.
On SL 4C we added Note 8 to remind the Contractor of the 6-foot lateral offset between the 2 grounding rods required by the NEC.

Discussion points were:

- Robert asked about the drawing detail showing 48” but mentioning that it also says 6-foot minimum, and asked if 48” could ever be correct? Mike explained how the measurement worked with the grounding rod and showed that even with the 48” dimension, you can get the 6 feet. Mike said the note actually says that you need 6 feet between ground rods. Robert understood and thanked Mike for clearing up his confusion with the notes. And Robert noted that the two notes aren’t conflicting like he’d thought.

- Mike continued with his presentation by talking about Standard Specification 13591M, saying that the field technicians needed a better way of identifying which home run cable they were looking at in the pc junction boxes and at the cabinet. A revised Table 1 has been introduced. Table 1 provides the color coding system that uses colored tape placed in ordered bands around the end of the home run cable. This is similar to how Electronic Resistors are classified. The color coding determines which detector loop home run cable and where it sits within the ramp meter detector loop system.

- Fred wanted to ask about one of Ray’s comments about a ramp with 4 lanes and your response says that there will never a 4th lane. I know of ramps now that have 4 lanes. The 90th South Northbound on ramp has 4 lanes that are metered. Mike said that got by him saying he didn’t know about that. Mike detailed a few issues with their reorganization in their group and that detail was missed. Fred said that was okay. Mike said that if we wanted to add a 4th lane, we could just repeat the color code.

- Derek suggested a change to AT 2 saying that it should say roadway surface rather than roadway crown. Fred and Derek discussed the difference between the two. Derek said that Traffic Signals were installed to height using the surface and not the peak or crown. Derek quoted a note from the signal drawing that AT 2 now references.

- Several discussions took place that overlapped with ideas or suggestions on how best to correct AT 2. The recording became a little garbled.

- It was decided that all the detail regarding the roadway crown would be removed and the reference with the height detail that points to the signal drawings would guide on how to install the signal, including the height from roadway to signal pole. Everyone did a quick review of the SL Drawing to verify that it covered the installation height. Fred wondered if the note should be copied over to the AT 2. Several said that we already have the reference and that wasn't needed. Fred asked why we are referencing this other drawing rather than calling it out. Rick and Robert both pointed out different details that are on the signal drawing that would be needed for installation. Rick pointed out that by sending readers to the signal drawing would allow for fewer mistakes in the field and more consistent installation of signal poles. Robert said it's a lot of extra reading, but it is worth it.
-

Motion: James Corney made a motion to approve the specification with the addition of a 4th lane to the table. Seconded by Robert Miles. Approved unanimously.
Robert Miles made a motion to approve the drawings with modification to AT 2 pole detail removing the roadway crown. Seconded by Rick Torgerson. Approved unanimously.

9. Review of Assignment/Action Log

- Brad gave a quick review of the action log pointing out that most of the items are ongoing, several of them were Chris Whipple's and they were on the agenda today and approved.

- Rick asked for the Stormwater/Sweepings from 01355 Environmental Compliance be added to the Log for Rod to work on.

- Brad gave an overview of the proposed new Submittal Sheet that emphasizes the need to give thought to the cost impact of changes per Kris Peterson's mandate. Robert Stewart suggested adding something to the Submittal Sheet that forces people to figure out what other documents might be impacted by the change. The group agreed with these changes.

- George mentioned that we changed to using a Google Site for the review this time and outlined the challenges we faced using the previous Interchange site. He also said that if anyone has any suggestions to let us know. Fred said he thought it went smoother.

10. Other Business:

A. Editorial Change Recap.

- **AT 14, Solar Traffic Counting Station** (Michael Adams)
  Details A and B: Corrected the drawing references and updated the Pull Box to proper nomenclature: Type 1-PC Junction Box. In addition, added ground hatching in Detail A that was approved at February Standards meeting but was left off in error.

B. Next Standards Edition

No additional items.

There was no further discussion or other business.

A motion was made by Robert Miles, seconded by Rick Torgerson, and approved unanimously to adjourn.

The next regular meeting of the Standards Committee was scheduled for August 29, 2019, at 8:30 a.m., in the Redwood A conference room of the Rampton Complex.

Approval of Minutes: The foregoing minutes were approved at a meeting of the Standards Committee held _____, 2017.

Regular Assignment/Action Item Log				
Date Initiated/Updated	Action	Assignments	Status	Target Date
August 30, 2018	Design Drawing Committee to continue removing design information from drawings	Tiffany Pocock	Open	Ongoing (Many drawings on August 2019 Agenda)
February 22, 2018	Electronic Book/App	George Lukes/Brad Yeates	Open	Ongoing
June 27, 2019	01355M Environmental Compliance – Stormwater related material/Sweepings	Rod Hess	Open	October 2019

Regular Closed Items From Last Meeting

Date Initiated/Updated	Action	Assignments	Status	Target Date
February 28, 2019	02983, Grinding for Grooved-in Pavement Markings (New Specification)	Chris Whipple	Closed	Approved at June 2019 Meeting
February 28, 2019	SL 06A, Pedestrian Signal Assembly	Chris Whipple	Closed	Approved at June 2019 Meeting
February 28, 2019	BA 1B, Concrete Barrier Median Installation BA 1C, Concrete Barrier Shoulder Installation	Chris Whipple	Closed	Approved at June 2019 Meeting

Standards Committee Agenda Items Section

Submittal Sheets, Comment Forms, Supplemental Specification Drafts, Supplemental Drawing Drafts, and other supporting data as required for the August 29, 2019 Standards Committee meeting follows this page.

Standards Committee Submittal Sheet

Name of Preparer: James Corney

Title/Position of Preparer: Structures Construction Engineer

Specification/Drawing/Item Title: Reinforcing Steel and Welded Wire

Specification/Drawing Number: 03211

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

This submittal change is proposed to address:

- **Changes in AASHTO methodology for post-installed epoxy anchors**
- **Corrections to relevant ASTM's for galvanizing and epoxy for bars and wire**
- **Guidance on the repair of epoxy coatings on reinforcing steel**
- **Quality control requirements for ABC grouted splice coupler installation**
- **Miscellaneous corrections**

This revision was initiated by a need to provide the correct testing criteria to meet AASHTO's design methodology for post-installed epoxy anchors. The epoxy currently specified is less stringent than what is required. I then found that we have incorrect or missing ASTM's for coatings on reinforcing

steel and welded wire that should be corrected/added. As I was making those corrections it was requested to add additional guidance for the repair of those coatings in order to help our inspectors and contractors know what we expect for a repaired bar coating. Finally, I found a need for clarification in the ABC grouted splice couplers mention a manufacturer's technical representative, but do not define it in part 1. As part of that modification, because of the criticality of the ABC connections the technical representative is proposed to be onsite for the preparation and grouting.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
No change to Measurement and Payment.

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
No change to Acceptance and Documentation.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements
   No change.

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)
   No change.

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?
   None. The post-installed epoxy anchor material requirement change is a response to an existing change in AASHTO's design manual.

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).

   - **Post-installed anchor epoxy: Change may result in higher epoxy costs. Many post-installed anchor installations are currently**

using the required epoxy due to brand recognition of high quality post-installed epoxy anchor suppliers, but our spec currently does not require the use of these epoxies.

- **Correcting/updating coating ASTM's: Change should cause no change in costs. It may save an RFI or a few hours of confusion when materials do not match the published spec.**
- **Repair of coatings: Change should cause no change in costs or contractor's overhead. Change incorporates and clarifies requirements that are already included in referenced ASTM's or product application instructions. ASTM's are hard for inspectors to reference when the repair work is active and takes 15 seconds. Specified requirements are part of expected proper procedure.**
- **Quality control for ABC grouted splice couplers: Change will result in a slightly higher bid price for Precast Substructure Elements where this element is paid. The coupler and any associated time spent by the technical representative is minor compared to the cost of the fabrication and installation of the precast substructure elements. Costs are offset by the additional confidence gained by having an expert resource available and onsite for the installation of these extremely structure critical elements.**

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).
   - **Post-installed anchor epoxy: No operational costs anticipated.**
   - **Correcting/updating coating ASTM's: Potential savings of time due to improved clarity.**
   - **Repair of coatings: Proper repair of coatings is intended to result in less steel corrosion, which leads to less need for structural concrete repair and pothole patching.**
   - **Quality control for ABC grouted splice couplers: Any increase to the quality of precast substructure installation may result in better performance in extreme events. For the purposes of collapse prevention and life safety we will never know what benefits we achieved versus not having an expert resource on site at time of installation, but the increased confidence theoretically translates to potential lives saved.**

3. Life cycle cost.

   - **Post-installed anchor epoxy: Using an epoxy that meets design should provide the design life of structure. Using a lesser epoxy could lead to premature failure.**
   - **Correcting/updating coating ASTM's: No change to life cycle cost anticipated.**

- **Repair of coatings: Less steel corrosion increases the life of the structure.**
- **Quality control for ABC grouted splice couplers: No change to life cycle cost.**

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

- **Post-installed anchor epoxy: Using an epoxy that meets design should provide the design life of structure. Using a lesser epoxy could lead to premature failure.**
- **Correcting/updating coating ASTM's: Potential savings of time due to improved clarity.**
- **Repair of coatings: Proper repair of coatings is intended to result in less steel corrosion, which leads to less need for structural concrete repair and pothole patching. Less steel corrosion also increases the life of the structure.**
- **Quality control for ABC grouted splice couplers: Any increase to the quality of precast substructure installation may result in better performance in extreme events. For the purposes of collapse prevention and life safety we will never know what benefits we achieved versus not having an expert resource on site at time of installation, but the increased confidence theoretically translates to potential lives saved.**

H. Safety Impacts?
See responses above.

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

- **Repair of epoxy coatings: Request for update comes from UDOT inspector asking for assistance in providing guidelines on the repair of coatings. Inspector witnessed repairs where adjacent surfaces were not protected, coating was not applied at sufficient thickness, and concrete was placed before the coating repair dried.**

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #	COMMENT	RESPONSE	RESPONSE BY
7/16/2019 12:11:11	Rferrin@utah.gov	Ryan Ferrin	03211	No comments	Thank you	James Corney
7/17/2019 10:37:37	kthornock@utah.gov	Kirk Thornock	03211	No comments	Thank you	James Corney
7/18/2019 14:31:00	jtremaine@utah.gov	Janice	03211	No comment	Thank you	James Corney
7/18/2019 16:52:50	michaeladams@utah.gov	Michael A. Adams	03211	No Comment	Thank you	James Corney
7/19/2019 9:53:31	shawnlambert@utah.gov	Shawn Lambert	03211	No comments	Thank you	James Corney
7/19/2019 14:45:29	dfriant@utah.gov	Daryl Friant	03211	I have no comments	Thank you	James Corney
7/22/2019 18:11:18	dpage@utah.gov	Danny Page	3211	I have no comments at this time	Thank you	James Corney
7/24/2019 13:43:21	russell.robertson@dot.gov	FHWA	03211	No comments.	Thank you	James Corney
7/25/2019 10:38:44	vliu@utah.gov	Vincent Liu	No comments	No comments	Thank you	James Corney
7/29/2019 22:16:57	kentalbot@utah.gov	Ken Talbot	03211, 1.5.B.2	The punctuation for "respectively.3.Continous butt weld" needs to be fixed.	Thank you for catching that. It also happened to 1.5 B4 & 2.4 D2a. I don't know why	James Corney
7/29/2019 22:22:29	kentalbot@utah.gov	Ken Talbot	3211,1.5.B.2.a	Section 2.10 already requires the contractor to us department prequalified supplier for all reinforcing steel products so can section 1.5.B.2.a go away assuming the QC procedures are part of the pre-qual?	QMP 504 for Reinforcing Steel does not explicitly require any information specific to continuous butt welded reinforcing hoops, which is a process that is not a common function associated with most reinforcing steel needs. Prior to submittal review I discussed the need for welder certifications with Bryan Lee and Jeremy Price and was informed that the pre-qualification process does not encompass that information either.	James Corney
7/29/2019 22:24:13	kentalbot@utah.gov	Ken Talbot	3211, 1.5 B.2.b	Do we need to state what testing procedures we are following similar to the test procedures mentioned in 1.5.B.2?	Rather than informing the type of testing being performed, the list of M31 A706 and A955 are indicating which materials are to be submitted for verification testing.	James Corney
7/29/2019 22:25:09	kentalbot@utah.gov	Ken Talbot	03211, 1.5.B.2.b	Fix end of sentence.	Thank you again.	James Corney
7/29/2019 22:28:14	kentalbot@utah.gov	Ken Talbot	03211, 1.5.B.5	Should these be submitted for information instead of review?	The intent is to have the Engineer look at the submittal for conformance with the spec requirements and respond with an authorization to use the product before it is used. This is particularly true for the structural connection made with adhesive anchors. I also checked with Bill Lawrence who agreed that for review is appropriate.	James Corney
7/29/2019 22:29:41	kentalbot@utah.gov	Ken Talbot	03211, 1.5.D.3	How is "satisfactory performance" determined?	Satisfactory performance is essentially a structure that is still standing, it doesn't take much. These couplers are only tested under extreme load conditions. It also allows that if we were to contact the owning agency, and if they had complaints, we could reject.	James Corney
7/29/2019 22:30:48	kentalbot@utah.gov	Ken Talbot	3211, 1.6.B.1	How will "successful projects" be determined?	It's a subjective term, but we essentially don't want an installer claiming experience on a job that was known to have gone poorly. I could take out the word "successful' if you would prefer, but it still feels reasonable to have the positive spin on it.	James Corney
7/29/2019 22:32:26	kentalbot@utah.gov	Ken Talbot	03211, 2.4.D.1	Does the referenced ASTM define the epoxy material requirements or the repair procedure?	The ASTM provides the material requirements, and relies on the manufacturer for application instructions. But more importantly, the ASTM is typically prominent on the product and the data sheets.	James Corney

7/29/2019 22:34:16	kentalbot@utah.gov	Ken Talbot	03211, 2.6.A.2&3	This is a little confusing in the context of the various types of supports and tie wire in paragraph A. Are these two paragraphs referring to epoxy coated wire only?	No. The word "coating" applies to epoxy coatings, galvanized coatings, and plastic coatings. When the subparagraph applies to one type of coating, the type is called out specifically. Subparagraph 2 refers to general "coating," 3 refers to "epoxy coating," 4 refers to "plastic coating," 5 refers to "galvanized coating," 6 refers to "epoxy or plastic coatings."	James Corney
7/29/2019 22:35:27	kentalbot@utah.gov	Ken Talbot	03211, 2.6.A.6	Is the coating thickness something we are expecting to see in a cert or are we expecting our field guys to check this?	This is not something we request a submital for. But you ask a great question. I checked with Bryan Lee, and he thinks we can remove it.	James Corney
7/29/2019 22:38:08	kentalbot@utah.gov	Ken Talbot	03211, 2.6.A.7	Compare this to section 2.4.D to make sure there are no conflicts in requirements.	I don't see any conflicts. Also note that these requirements apply to different products. 2.4 D for rebar, and 2.6 A for tie wires and bar supports.	James Corney
7/29/2019 22:39:48	kentalbot@utah.gov	Ken Talbot	03211, 2.6.B.1	is this needed? is this something we have always required so it is still in here or are these numbers correct and applicable? Could it be replaced with a requirement to remove any blocks that have cracked or are damaged?	This is something that we have always required, but it is worthwile to require a minimum strength for a material that is integrated into the concrete structure. 2,500 psi is the minimum strength of any class of concrete specified in 03055. Although I do r want to delete this requirement, I do like officially disallowing cracked or damaged blocks. I have added that to 3.3 L.	
7/29/2019 22:40:34	kentalbot@utah.gov	Ken Talbot	03211, 2.6.B.2	Does the contact area matter and is the contact area referring to the contact with the ground?	Because concrete block bar supports are on allowed in slab on grade the contact area is valuable for ensuring that as bar is placed a workers walk on the bar, the supports do not settle. I will add "ground" to "minimum [ground] contact area of 24 in2."	
7/29/2019 22:42:10	kentalbot@utah.gov	Ken Talbot	03211, 2.7.C	is there a specific procedure to be used for this? I assume this is a field operation?	Couplers should be purchased with the appropriate coating. Revised to say "Use coated couplers with the same type of coating as the reinforcing steel being spliced" this is more in line with paragraph D "use stainless steel coupler with..."	James Corney
7/29/2019 22:42:51	kentalbot@utah.gov	Ken Talbot	03211, 2.8.A.2	does this need to be more specific and say Section 2.8?	Yes, added.	James Corney
7/29/2019 22:44:31	kentalbot@utah.gov	Ken Talbot	03211, 2.10.A	if we are requiring the use of prequalified suppliers, are there certs or other submittals that have been supplied by this supplier that are no longer needed in the spec? Can this 2.10 go away?	The requirement to use a Department Prequalified Supplier needs to remain. Unfortunately, as I responded in a previous comment, the QMP for prequalification does not require the continuous butt welded hoop information specifically requested when those products are required. Since the two do not overlap, the two requirements should remain.	James Corney
7/29/2019 22:45:48	kentalbot@utah.gov	Ken Talbot	03211, 3.3.B	This requirement is also listed in 3.6.B, could be removed from one of the locations.	Agreed. Removed from the more general "Placement" article, since an article exists for Field Bending	James Corney
7/29/2019 22:47:48	kentalbot@utah.gov	Ken Talbot	03211, 3.3.F	This is very similar to 3.3.L - can 3.3.F be removed?	Agreed. The additional requirement to only use the blocks to support the bottom mat of bars added to L.	James Corney
7/29/2019 22:57:08	kentalbot@utah.gov	Ken Talbot	03211, 3.3.N.1.a	Can nylon cable ties be used to bind all types of reinforcing?	No. The use of nylon cable ties is specific to the tying of stainless steel to carbon steel across a spacer. I think I incorrectly moved the nylon cable ties above the 1 inch clearance requirement and caused confusion. Will move below as 1).	James Corney

7/29/2019 23:00:40	kentalbot@utah.gov	Ken Talbot	03211, 3.3.N.1.b.1)	Will the SDDM or other structural design standards ever allow for this to happen? Seems like it should not be allowed, and if it is absolutely necessary, then it can happen by deviation and detailed in the plans.	Although we don't want this to happen it is important to have a contingency in case a situation like this occurs unexpectedly (e.g. stainless deck steel and armored strip seal extrusion with anchor bolts placed by the supplier). If this paragraph was revised to "contact the Engineer if less than 1 inch clearance exists" then the direction to proceed would typically be the instructions shown here.	James Corney
7/29/2019 23:01:41	kentalbot@utah.gov	Ken Talbot	03211,3.5.C	Shouldn't the plans detail out the stagger splice requirements?	Usually the plans will, particularly if Structures owned, but this is simple backup if the plans missed it.	James Corney
7/29/2019 23:02:57	kentalbot@utah.gov	Ken Talbot	3211, 3.5.D	What does this mean?	Good question. Will revised to focus on the clear cover. "Place and tie lapped splices in the bars to maintain the clearance to the surface of the concrete shown"	James Corney
7/29/2019 23:04:47	kentalbot@utah.gov	Ken Talbot	03211,3.8.E	The coupler is easy to meet this requirement but how do you do this for the rebar?	Revised to say "Saturate Surface Dry (SSD) all concrete surfaces in the joint before connecting the elements."	James Corney
7/29/2019 23:07:13	kentalbot@utah.gov	Ken Talbotg	03211,3.8.k	This seems difficult to verify - what if the word was changed from verify to "ensure"	Agreed, verify doesn't seem to be the right word. Will reword to "Protect sleeves from vibration, shock, or other excessive movement until temporary bracing is removed."	James Corney
7/30/2019 8:52:20	kbarrett@utah.gov	Kelly Barrett	03211	Nothing of concern	Thank you	James Corney
7/30/2019 9:21:30	branden@utah.gov	Branden Anderson	SECTION 03211 REINFC	No Comment	Thank you	James Corney
7/30/2019 14:36:42	fdoehring@utah.gov	Fred Doehring	All	No comments on the changes. Thank you for the thorough Cost discussion	Thank you	James Corney
7/30/2019 18:17:09	betty@wadsco.com	AGC	03211	No comments received from the AGC	Thank you	James Corney
7/31/2019 7:35:58	dlahusen@avenueconsulta	ACEC	03211	No Comment	Thank you	James Corney
7/31/2019 11:09:57	brettslater@utah.gov	Brett Slater	03211	No Comment	Thank you	James Corney
7/31/2019 21:28:34	raycook@utah.gov	Ray Cook	03211, 1.5 C & D	Suggest to combine grouted splice coupler qualifications (1.5 C2 & 1.5 D) into a single submittal Note that CSI places all certifications under Quality Assurance Submittals.	I was trying to separate the contractor's requirements from the manufactuer's requirements, but I can see that a single submittal would be easier to manage. Revised C to "Continuous resistance butt welded hoop welder certifications" and D to "Grouted splice coupler quality assurance qualifications for information"	James Corney
7/31/2019 21:30:19	raycook@utah.gov	Ray Cook	03211, 1.6	CSI places Qualifications and Certifications under Quality Assurance Article. (Heading should be Quality Assurance.)	Returned to "Quality Assurance"	James Corney
7/31/2019 21:35:44	raycook@utah.gov	Ray Cook	03211, 2.6 A5	Begin sentence with a verb to be consistent with other 2.6 A subparagraphs.	Changed to "Provide galvanized coating according to ASTM A 641"	James Corney
7/31/2019 21:37:09	raycook@utah.gov	Ray Cook	03211, 2.7 B	Suggest to reword: "Use couplers capable of transferring at least 95 ksi in tension between the spliced reinforcing steel bars."	Tried to conform your sentence with 2.7 A1's wording. "Use reinforcing steel mechanical splice couplers capable of transferring at elast 95 ksi in tension between the spliced reinforcing steel bars."	James Corney
7/31/2019 21:40:04	raycook@utah.gov	Ray Cook	03211, 3.1 A5 / 3.2	Coating repair is not part of protecting the bars / coatings so it should at least be a paragraph under 3.1. I suggest to group together (1) all of the when to repair or replace requirements, and (2) the how to repair requirements. These should be 3.2 or a paragraph under 3.1.	Moved to 3.2 C "Limits for repair" with1. repair r	James Corney

7/31/2019 21:42:06	raycook@utah.gov	Ray Cook	03211, 3.1 A5 / 3.2	3.1 A5a says to repair minor damage, 3.1 A5b says to not use bars with moderate damage, 3.2C says to replace significant damage. To not use and to replace are the same. Are we saying that we are allowing more damage if the bar is in place than when it is not?	Yes. 3.1 A is referring to the protection of bars during handling and storage. In storage bars with moderate damage should not be used. This is a generalization of the previous wording to "Do not use bars with total damaged surface area of epoxy coating greater than 2 percent in any 1 ft section." 3.2 C is referring to the replacement of bars, at this point the bar is not in storage and is in the work where it can be scuffed and damaged through normal operations. Here we must allow for a higher level of tolerance for epoxy damage, so I went with "significant damage" This corresponds with the previous language to "reject any bars with 5 percent or greater damage to total surface area during all stages of work." This leaves judgement to the inspector, but reference to ASTM 3963 (7.3) can be used to settle disputes "The total bar surface area covered by patching material shall not exceed 5% in any given 1 ft section of coated reinforcement."	James Corney
7/31/2019 21:43:46	raycook@utah.gov	Ray Cook	03211, 3.1 A5b1	Reword to: "Cut ends are not considered damage for this purpose."	Yeah that's better.	James Corney
7/31/2019 21:46:02	raycook@utah.gov	Ray Cook	03211, 3.2	3.2: This is the only article heading that begins with a verb. Revise. (Coating Repair?) 3.2 A2: Revise “area to be repaired” to “repair area.” 3.2 A3: “materials” doesn’t seem to be the correct term. 3.2 B2: Make portion of sentence after comma a new subparagraph B2a beginning with “Allow. . .” 3.2 C: Delete “identified in place.”	3.2 - agreed 3.2 A2 - agreed 3.2 A3 - revised to "Protect nearby [surfaces] from overspray 3.2 B2 - agreed 3.2 C - I would like to keep something that adds clarity to when this requirement is engaged. Used "Replace reinforcing steel bars incorporated into the work that have..."	James Corney
7/31/2019 21:47:49	raycook@utah.gov	Ray Cook	03211, 3.8 A	Reword: “Use grouted splice coupler installers according to . . .” Qualified personnel list is not the term used in 1.5.	Revised to: "Use grouted splice coupler installers according to the submitted grouted splice coupler installer qualifications"	James Corney
8/1/2019 10:20:16	cmason-hill@utah.gov	Charles Mason-Hill	03211	No Comment		

Supplemental Specification
2017 Standard Specification Book

SECTION 03211

REINFORCING STEEL AND WELDED WIRE

Delete Section 03211 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel, steel welded wire reinforcement, dowelled anchors, T-headed bars, mechanical couplers, and grouted splice couplers.

B. Coating for reinforcing steel, steel welded wire reinforcement, and dowelled anchors.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

A. AASHTO M 31: Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

~~B. AASHTO M 111: Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products~~

~~C. AASHTO M 235: Epoxy Resin Adhesives~~

BD. AASHTO M 336: Steel Wire and Welded Wire, Plain and Deformed, for Concrete Reinforcement

CE. AASHTO T 106: Compressive Strength of Hydraulic Cement Mortar (Using 50-mm or 2-in Cube Specimens)

DF. ASTM A 108: Steel Bar, Carbon and Alloy, Cold-Finished

E. ASTM A 641: Zinc-Coated (Galvanized) Carbon Steel Wire

FG. ASTM A 493: Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging

Commented [JC1]: AASHTO now refers to ACI 318 for anchor design. "Anchors intended to comply with the provisions of this Article shall be deigned, detailed and installed using the provisions of ACI 318-14, Chapter 17..." – 5.13.1.
ACI 318-14 requires "Adhesive anchors that meet the assessment criteria of ACI 355.4" – ACI 318-14 17.1.3.

GH. ASTM A 706: Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

HI. ASTM A 767: Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement

IJ. ASTM A 775: Epoxy-Coated Steel Reinforcing Bars

J. ASTM A 884: Epoxy-Coated Steel Wire and Welded Wire Reinforcement

K. ASTM A 934: Epoxy-Coated Prefabricated Steel Reinforcing Bars

L. ASTM A 955: Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement

M. ASTM A 970: Headed Steel Bars for Concrete Reinforcement

N. ASTM A 1060: Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete

O. ASTM D 3963: Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars

PN. ASTM E 3121~~ E 1512~~: Field Testing of Anchors in Concrete or Masonry ~~Testing Bond Performance of Bonded Anchors~~

Q. ACI 355.4: Qualification of Post-Installed Adhesive Anchors in Concrete

RO. American Welding Society (AWS) Standards

SP. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice

Commented [JC2]: Previously no ASTM provided for coatings on WWR

Commented [JC3]: Requirements for epoxy coating repair materials

Commented [JC4]: E 3121 is a field test for anchors. E 1512 is a lab test.

Commented [JC5]: The new qualification for post-installed adhesive anchors per AASHTO / ACI 318.

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Working Drawings
   1. Detailed shop drawings for review of the following:
      a. Field bending procedure if required. Provide the seal of a Professional Engineer (PE) or Professional Structurale~~~~ Engineer (SE) licensed in the State of Utah.
      b. Mechanical butt splice shop drawings when proposed details differ from the plans and specifications.
         1) Show number and location of mechanical butt splices.
         2) Provide two samples of mechanical butt splices and test to destruction in the presence of the Engineer.

B. Material Submittals

1. Certificate~~s~~ of Compliance from the manufacturer.

~~2. Samples for verification testing to meet the testing requirements of AASHTO M 31, ASTM A 706, and ASTM A 955, respectively.~~

~~3~~2. Continuous butt welded reinforcing hoops.

a. Manufacturer's Quality Control (QC) procedures for the hoop fabrication for review. Include the following as a minimum:

1) The pre-production procedures for the qualification of material and equipment.

2) The methods and frequencies for performing QC procedures during production.

3) The calibration procedures and calibration frequency for all equipment.

4) The welding procedure specification (WPS) for resistance welding.

5) The method for identifying and tracking lots.

b. Two samples of welded splices for verification testing.

~~4~~3. Grouted Splice Couplers

a. Independent test report for review confirming coupler compliance for each supplied coupler size with the following:

1) Develop 150 percent of the specified yield strength of the connected bar.

2) Determine by testing the amount of time and grout compressive strength required to provide 100 percent of the specified minimum yield strength of the attached reinforcing bar. Use this value to determine when to release bracing.

3) Use the same grout in the testing that will be used in the construction.

4) Requirements for the grout including required strength gain to develop the specified minimum yield strength of the connected reinforcing bar.

~~5~~4. ~~Epoxy~~ Post-installed adhesive anchor material data sheet and recommended installation instructions for review~~.~~

C. Continuous resistance butt welded hoop welder certifications

1. Include welder test reports for each operator, process, and position as required by AWS specifications.

2. Include a letter that states the certified welders have been using the process without an interruption of more than six months since being certified.

D. Grouted splice coupler quality assurance qualifications for information

1. Grouted splice coupler installer qualifications

Commented [JC6]: Resistance butt welded hoops must be welded by a certified welder. There was previously no requirement for a submittal of that certification. This language is similar to 05120 Structural steel and 02455 Driven Piles

Commented [JC7]: Moved up and rewritten from 3.8

a. Provide names and state experience or training of personnel responsible for installation of the grouted splice couplers.
1) Include a certificate or statement of training with the names of the trained individuals signed by the manufacturer's representative

2. Grouted splice coupler manufacturer's technical support representative qualifications. Include at least the following:
a. Company name
b. Name and phone number of the technical support representative
c. List of projects using the submitted grouted splice coupler with at least two years of satisfactory performance. List the following for each project:
1) Project name
2) Bridge location (state routes and bridge identifiers)
3) Scope of work
4) Products used

Commented [JC8]: Requiring the representative to be on site seems to be valuable for this critical bridge element. We no longer use this type of ABC as a regular practice, so local experience is limited. We require technical support representatives to be on site for pot-hole patching, so it seems like this much more critical element deserves this level of attention

1.6 QUALITY ASSURANCE

A. Grouted splice coupler manufacturer's technical support representative
~~. The Department may witness coating processes for project work.~~
1. Provide a technical support representative onsite during preparation and grouting of the grouted splice coupler

Commented [JC9]: Redundant. 00727: Control of Work Paragraph 1.7 A 1 states "Inspection may extend to the sites of preparation, fabrication, or manufacture of materials to be used."

B. Grouted splice coupler installers
1. Installers must be familiar with installation and grouting of splice couplers and that have completed at least two successful projects in the last two years.
a. Train new personnel within three months of installation by a manufacturer's technical representative as an acceptable substitution for the experience.

PART 2 PRODUCTS

2.1 REINFORCING STEEL

A. Deformed or plain carbon steel bars~~.~~
1. Refer to AASHTO M 31, Grade 60.

B. Deformed or plain low-alloy steel bars~~.~~
1. Refer to ASTM A 706, Grade 60.

C. Deformed or plain stainless steel bars~~.~~
1. Refer to ASTM A 955, Type XM-28.

2.2 WIRE AND WIRE REINFORCEMENT

A. Refer to AASHTO M 336 for cold drawn steel wire.

B. Refer to AASHTO M 366 for steel welded wire reinforcement.

2.3 T-HEADED BARS

A. Use T-headed bars consisting of deformed rebar with steel plates friction welded to one end of the rebar. Friction welding conforms to the authorized quality control manual and AWS C6.2, Friction Welding of Metals.
   1. Headed Bars that meet the requirements of ASTM A 970 may be substituted.

B. Use deformed rebar according to ASTM A 706, Grade 60.

C. Cut plate heads for T-headed bars from flats of hot-rolled steel according to ASTM A 108.

2.4 COATINGS

A. Epoxy Coating~~.~~
   1. Reinforcing steel
      a. Refer to ASTM A 775 or ASTM A 934.
   2. Wire and wire reinforcement
      b. Refer to ASTM A 884.

B. Galvanized Coating~~.~~
   1. Reinforcing steel
      a. Refer to ~~AASHTO M 111~~ ASTM A 767.
   2. Wire and wire reinforcement.
      a. Coat welded wire after fabrication.
      b. Refer to ASTM A 1060.

C. Coat bars as described.
   1. Maintain epoxy coating thickness between 8 and 12 mils.
   2. Maintain galvanized coating thickness according to ASTM A~~.~~ 767.
   3. Coat bars after bending unless the fabricator can show that satisfactory results can be obtained by coating before bending.
   4. Do not use bent bars with visible cracks or damage in the coating.

D. Coating Repair Materials
   1. Meet requirements of ASTM D 3963 for repair of epoxy coatings.

Commented [JC10]: Refer to AASHTO M111 1.5 "Fabricated reinforcing steel bar assemblies are covered by the present specification. The galvanizing of separate reinforcing steel bars shall be in accordance with ASTM A767/A767M or A1094/A1094M"

Only A767 is specified here. The A1094 galvanizing process provides a galvanizing thickness of 2.0 mils (min) M111 applies 3.9 mils (min) for rebar assemblies and A767 applies 3.4 mils (min).

A767 has class 2 (3.4 mils) and class 1 (5.9 mils). Although class 1 is used by many DOTs, class 2 more closely matches the AASHTO specification and is less expensive.

By not declaring class 1 or class 2 we will get the cheaper version without needing to add confusion of checking the class, just meet ASTM A 767. ASTM A1094 does not provide galvanizing thicknesses similar to AASHTO M111, so I am not including that spec.

Commented [JC11]: A1060 allows for coating application before or after fabrication. After fabrication is preferred.

Commented [JC12]: Added to provide clarity to repair requirements

2. Use Inorganic Zinc-Rich Paint with 65 to 69 percent metallic zinc by weight, or greater than 92 percent metallic zinc by weight in dry film for repair of galvanized coatings.
   a. Do not use spray applied galvanized coating repair materials.

Commented [JC13]: Refer to AASHTO Construction spec 12.8 "Repairing damaged galvanized coatings… Spray cans shall not be used."

2.5 DOWELLED ANCHORS

A. Post-Installed Adhesive Anchors
   1. Use ~~epoxy resin~~ adhesive satisfying the assessment criteria of ACI 355.4 including qualifications for seismic loading.~~according to AASHTO M 235, Type V, Grade 3.~~

Commented [JC14]: "Dowelled anchors" include post-installed mechanically attached anchors and post-installed adhesive anchors. Mechanical anchors are highly proprietary, and for the purpose of dowelling reinforcing steel, only adhesive anchors are specified. The term "dowelled anchor" is used in other specification sections, reducing the spec item to "adhesive anchors" would require additional changes in other sections.

B. Use reinforcing steel, bolts, and anchors as shown.

2.6 BAR SUPPORTS AND TIE WIRE

A. Provide epoxy coated, galvanized, plastic coated, or plastic bar supports and tie wire ~~for reinforcing steel other than stainless steel~~ that meet the following requirements when not in contact with stainless steel:
   1. Meet the requirements of Table 1.
   2. Remove contaminants that affect the adhesion of the coating to the wire.
   3. Use an electrostatic spray method, fluidized bed, or flocking to apply an epoxy coating.
   4. Apply plastic coating by spraying, dipping, or using as a powder.
   5. Provide ~~G~~galvanized coating ~~thickness is~~ according to ASTM A 641 ~~AASHTO M 111.~~
   ~~6. Maintain the thickness of epoxy or plastic coatings of at least 5 mils with no maximum.~~
   6~~7~~. Use patching material according to the manufacturer's recommendation to repair damaged coating.
      a. Use patching material that is compatible with the coating and that is inert in concrete.
      b. Do not repair hanger marks on the coated bar supports that result from the coating application process. Hanger marks are not considered damaged coating.
   7~~8~~. Use 16 gauge coated tie wire.
      a. Do not use galvanized tie wire with epoxy coated reinforcing steel.

Commented [JC15]: Sometimes wire can be used for utility away from reinforcing steel. This clarifies that we have two conditions, in contact with stainless steel and away from stainless steel.

Commented [JC16]: ASTM Applicable to tie wire galvanization

Commented [JC17]: This is to reduce the cutting into the coating if the tie wire is tied too tightly (comment from inspector)

B. Precast concrete block bar supports that conform to the following:
   1. Provide minimum 28-day compressive strength of 2,500 psi.
   2. Use three inch thick supports with sides ranging from 4 to 6 inches with a minimum ground contact area of 24 in^2.

Commented [JC18]: Response to comment from Ken Talbot:
"Does the contact area matter and is the contact area referring to the contact with the ground?"
"Because concrete block bar supports are only allowed in slab on grade the contact area is valuable for ensuring that as bar is placed and workers walk on the bar, the supports do not settle. I will add "ground" to "minimum [ground] contact area of 24 in2." "

C. Provide bar supports and tie wires for use with stainless steel bars that meet the following:
   1. Meet the requirements of Table 1.
   2. Provide bar supports that are plastic or stainless steel conforming to the requirements of ASTM A 493, Type 316.
   3. Provide tie wires that are plastic or stainless steel conforming to the requirements of ASTM A 493, Type 316, annealed.

2.7 MECHANICAL SPLICE COUPLER

A. Elastic capacity couplers~~Service strength bars~~:
   1. Use ~~R~~reinforcing steel mechanical splice couplers ~~shown by tests to be~~ capable of developing in tension 125 percent of the specified yield strength of the reinforcing steel bar.

B. Ultimate strength couplers ~~bars~~:
   1. Use where shown.
   2. For Grade 60 reinforcing steel bars
      a. Use ~~R~~reinforcing steel mechanical splice couplers ~~shown by tests to be~~ capable of ~~developing~~ transferring at least 95 ksi in tension between the spliced reinforcing steel bars. ~~in tension 150 percent of the specified yield strength of the reinforcing bar.~~

C. Use coated couplers ~~Coat the coupler~~ with the same type of coating as the reinforcing steel being spliced.

D. Use stainless steel splice coupler with stainless steel reinforcement.

2.8 GROUTED SPLICE COUPLER

A. Use grouted splice couplers to join precast elements as shown.
   1. Provide couplers that use cementitious grout placed inside a steel casting. Grout is part of the proprietary system and is provided by the coupler manufacturer.
   ~~2. Use threaded connections at the Contractor's option for the portions of the coupler that are placed within the precast element if the strength of the coupler meets or exceeds the requirements of this Section.~~

B. Use one of the following grouted splice coupler manufacturers according to the requirements of this Section. Refer to http://www.udot.utah.gov/go/standardsreferences for information on the following providers:

Commented [JC19]: Comment received that "Service Strength" was an incorrect term. Revised to "Elastic capacity" which is more easily understood. ACI refers to Type 1 and Type 2 couplers. The definitions for these couplers do not match the strengths required for AASHTO. Therefore this naming convention was not used.

Commented [JC20]: AASHTO Guide Spec for Seismic requires couplers in plastic hinging regions (special areas the designer will designate) to develop "the expected tensile strength of the bars" -8.8.3. Table 8.4.2-1 provides the expected tensile strength as 95 ksi for ASTM A 706 Gr 60 and A 615 Gr 60 reinforcing steel. This is higher than what ACI typically requires for seismic connections. To achieve this strength couplers designated for higher grades (per ACI 318 building code) will need to be provided (e.g. ACI Type 2 for A706 Gr 75).

Commented [JC21]: Response to comment from Ken Talbot:
"is there a specific procedure to be used for this? I assume this is a field operation?"
"Couplers should be purchased with the appropriate coating. Revised to say "Use coated couplers with the same type of coating as the reinforcing steel being spliced" this is more in line with paragraph D "use stainless steel coupler with..." "

Commented [JC22]: Response to comment from Ken Talbot:
"does this need to be more specific and say Section 2.8?"
I thought so at first, but no it actually refers to 2.7 for the threaded end to act as a "mechanical splice coupler" But I am deleting this subparagraph since we are explicitly specifying the three types of grouted splice coupler we allow on our projects and this requirement should not be used to exclude what we specify.

1. NMB Splice Sleeve
   Splice Sleeve North America, Inc.
   38777 West Six Mile Road, Suite 205
   Livonia, MI 48152
2. Sleeve-Lock Grout Sleeve System
   Dayton Superior Corporation
   1125 Byers Road
   Miamisburg, OH 45342
3. Lenton Interlok
   Pantair USA
   34600 Solon Road
   Solon, OH 44139

C. Use grouted splice couplers that provide 150 percent of the specified yield strength of the connected bar.

D. Use grout supplied by the manufacturer of the coupler and that matches the certified test report for the coupler.

E. Use the same coating system as used for the reinforcing steel.
   1. Use grouted splice couplers that join the reinforcing steel without removal of the epoxy coating on the spliced bar when using epoxy coated reinforcing steel.

2.9 CONTINUOUS RESISTANCE BUTT WELDED HOOPS

A. Weld only reinforcing steel conforming to ASTM A 706 as shown.
   1. Use resistance butt welded splices for continuous hoops.

B. Refer to AWS D1.4: Structural Welding Code - Reinforcing Steel.

~~C. Perform welding only by an AWS certified welder.~~

C~~D~~. Change welding procedures to reflect chemical composition of the steel.
   1. Welders must have correct mill test report (chemical analysis) from the heat in which the steel was made.

~~E. Use only a welded splice capable of transferring the minimum ultimate tensile strength of the reinforcing bar from one bar to the other.~~

D~~F~~. Apply coating after all welding has been completed.

Commented [JC23]: The use of resistance butt welded splices is a spec requirement, so there is no choice to use a weld that is not capable of transferring the ultimate tensile strength of the bar. We also do not have any specific project testing requirements to verify the quality of the weld, so this requirement has no additional value

2.10 FABRICATION

A. Use Department Prequalified Suppliers for all reinforcing steel products.

B. Bend reinforcement to the shapes as shown. Refer to CRSI Manual of Standard Practice.

C. Do not heat the bars during the bending operations.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Protect the bars and the coating during handling and storage.
1. Use systems with padded contact areas when handling epoxy coated bars.
2. Pad all bundling bands for epoxy coated bars.
3. Lift all bundles with strong-back, multiple supports, or a platform bridge.
4. Do not drop or drag bars.

~~B. Repair damaged coating.~~
~~1. Epoxy Coated~~
~~a. Meet requirements of ASTM A 775 Appendix A.2 for repair material.~~
~~b. Follow manufacturer recommendations for repairs.~~
~~c. Do not use bars with total damaged surface area of epoxy coating greater than 2 percent in any 1 ft section.~~
~~d. Do not use bars with 5 percent or greater damage to total surface area during all stages of work.~~
~~2. Galvanized~~
~~a. Use Inorganic Zinc Rich Paint with 65 to 69 percent zinc by weight or greater than 92 percent by weight metallic zinc in dry film for repair material.~~
~~b. Follow manufacturer recommendations for repairs.~~
~~c. Reject bars with total damaged surface area of coating greater than 2 percent in any 1 ft section.~~
~~d. Reject any bars with 5 percent or greater damage to total surface area during all stages of work.~~

B~~C~~. Store bars above the ground surface on wooden or padded supports.
1. Place timbers between bundles when stacking is necessary.
2. Space the supports close enough to prevent sags in the bundles.

C~~D~~. Cover epoxy coated reinforcing steel with an opaque covering upon delivery to the project site.
1. Protect epoxy coated reinforcing steel that has been partially embedded in concrete or placed in formwork.

a. Cover with an opaque covering before 30 days exposure to sunlight.

2. Place the opaque coverings to provide air circulation and prevent condensation on the reinforcing steel.

D~~E~~. Ship, handle, and store stainless reinforcing steel so it does not come in contact with carbon steel.

1. Cover stainless reinforcing steel with tarps during outdoor storage.
2. Separate bundles of stainless reinforcing steel from other types of reinforcing steel with wooden spacers.
3. Store stainless reinforcing steel on wooden supports off the ground or floor.

3.2 COATING REPAIR

A. General

1. Follow product manufacturer recommendations for repairs.
2. Clean and dry repair area.
3. Protect nearby surfaces from overspray.
4. Allow at least 45 minutes of drying time before encasing repaired reinforcing bar in concrete.

B. Epoxy Coatings

1. Do not apply repair materials at temperatures below 50 degrees F except where application instructions explicitly state lower temperatures are allowed.
2. Apply multiple coats when using spray applied coating repair materials.
   a. Allow a few minutes between coats to avoid drips and runs.

C. Limits for Repair

1. Repair minor damage to coatings and cut reinforcing steel bar ends with specified coating repair materials before placement.
   a. Refer to this Section, Article 3.2.
2. Do not use bars with moderate damage to coatings within any one foot length of the reinforcing steel bar or as determined by the Engineer.
   a. Cut ends are not considered damage for this purpose.
3. Replace installed reinforcing steel bars that have significant damage to coatings within any one foot length of the reinforcing steel bar or as determined by the Engineer.

Commented [JC24]: Time until dry enough to handle is typically 30 min in normal temperatures. Encasing in concrete should get a little more time, and an allowance for variable temperatures brings us up to 45 minutes.

Commented [JC25]: Scott Strader told me that finding temperature limitations on the product in the field is difficult. 50 degrees is the low range for the application of the products I researched. "Rebar Green" by Aervoe recommends 60 degrees "for best results" but other products list a minimum as 50 degrees.

Commented [JC26]: Previous language and ASTM language is overly technical "2% of coating area per foot." After speaking to UDOT inspectors this is more appropriately left up to field determination and people in the field understand when damage goes beyond simple repair. The ASTM is still incorporated by 2.4 for the technical definition of damage if the use of the bar reaches an escalation point.

Commented [JC27]: Execution of the repair brought outside of "delivery, storage, and handling"

Commented [JC28]: 3.1 A5 states to "do not use" bars with moderate damage to the coating. Damage can occur in the field which leads to a higher tolerance. So the language here is "replace" bars with significant damage. Previous language was 2% per foot or 5% per foot during all stages of work.

3.32 PLACEMENT

A. Maintain a clean surface keeping all reinforcement free from loose mill scale, loose or thick rust, dirt, paint, oil, or grease.

~~B. Field bend bars according to the authorized field bending procedures.~~

BC. Place all reinforcement in designated position and securely hold in position while placing and vibrating concrete.

1. Placing Tolerances
   a. Decks or members 10 inches or less in thickness
      1) Cover: -⅛ inch, + ¼ inch.
      2) Longitudinal spacing for individual bars: ±1 inch.
         a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
      3) Average spacing for 10 bars: $+^{1}/_{16}$ inch.
         a) Do not use tolerance to decrease number of bars or increase bar spacing.
   b. Members 10 to 20 inches in thickness
      1) Cover: ±¼ inch.
      2) Longitudinal spacing for individual bars, stirrups, or ties: ±1 inch.
         a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
      3) Average spacing for 10 bars: $+^{1}/_{16}$ inch.
         a) Do not use tolerance to decrease number of bars or increase bar spacing.
   c. Members greater than 20 inches in thickness
      1) Cover: -¼ inch, + ½ inch.
      2) Spacing for stirrups or ties: ±3 inches.
         a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
      3) Longitudinal bar spacing ±3 inches.
         a) Clear spacing between bars: not less than the greater of 1½ inches, 1½ bar diameters, and 1½ times the maximum aggregate size.
      4) Average spacing for 20 bars: +¼ inch.
         a) Do not use tolerance to decrease number of bars or increase bar spacing.
   d. Length of bar laps -1 inch
   e. Embedment length -1 inch

Commented [JC29]: Response to comment from Ken Talbot:
"This requirement is also listed in 3.6.B, could be removed from one of the locations."
"Agreed. Removed from the more general "Placement" article, since an article exists for Field Bending"

CD. Tie bars together with ties at intersections except when spacing is less than 9 inches in each direction, in which case tie at alternate intersections.
1. Tie bundled bars together at not more than 6 ft centers.

DE. Maintain the required distance from the forms and between layers of reinforcement with prefabricated chairs, ties, hangers, or other devices.

~~F. Use precast concrete block bar supports only when the concrete is placed in contact with the soil and then only as the support for the bottom mat of bars.~~

EG. Do not tack weld reinforcing bars in place.

FH. Overlap at least one panel of welded wire reinforcement sheets to each other and fasten at the ends and edges.

GHI. Support reinforcing steel for concrete "T" beams, pier caps, approach slabs, and deck slabs on metal chairs or bar supports according to this Section, Article 2.6.

HJ. Space chairs for supporting the top steel and bolsters for supporting the bottom steel not more than 4 ft on center of the bar in each direction.

IK. Tie deck steel to beams or forms at regular intervals of not more than 5 ft on center along the beams to prevent steel movement during concrete placement.

JL. Support reinforcing steel for slabs on grade on metal chairs attached to a sand plate or use precast concrete block supports according to this Section, Article 2.6.
1. Precast concrete block supports may only be used to support the bottom mat of bars.
a. Do not use blocks that are cracked or damaged.

KM. Do not place concrete until the Engineer has verified the reinforcement placement and fastening.

LN. Place stainless steel reinforcement so that it does not come in contact with carbon steel.
1. Do not tie stainless steel to uncoated or coated carbon steel reinforcement, galvanized attachments, or galvanized conduits.
a. Maintain at least 1 inch clearance between the metals using nylon or polyethylene spacers when stainless steel reinforcing or dowels must be near coated or uncoated

Commented [JC30]: Response to comment from Ken Talbot:
"This is very similar to 3.3.L - can 3.3.F be removed?"
"Agreed. The additional requirement to only use the blocks to support the bottom mat of bars added to L."

Commented [JC31]: Response to comment from Ken Talbot:
Regarding the strength requirement for precast concrete block bar supports 2.6 B1 "is this needed? is this something we have always required so it is still in here or are these numbers correct and applicable? Could it be replaced with a requirement to remove any blocks that have cracked or are damaged?"
"This is something that we have always required, but it is worthwile to require a minimum strength for a material that is integrated into the concrete structure. 2,500 psi is the minimum strength of any class of concrete specified in 03055. Although I do not want to delete this requirement, I do like officially disallowing cracked or damaged blocks. I have added that to 3.3 L. and combonded 3.3 F with 3.3 L."

reinforcing, or galvanized metals. ~~Bind using nylon cable ties.~~

1) Bind using nylon cable ties.

2~~1~~) Maintain at least 1 inch clearance unless insufficient space exists.

a) Either bar may be sleeved with a $^1/_8$ inch minimum thick insulator material, such as polyethylene, nylon or rubber tube, extending at least 1 inch in either direction past the point of closest contact between the two dissimilar bars.

b) Sleeves are not allowed for bars that run parallel to each other.

3.~~4~~3 FIELD CUTTING

A. Saw or shear coated bars that are specified to be cut in the field.
1. Do not flame cut.

B. Repair the coating at the sawed or sheared end using the specified patching or repair material.

3.~~5~~4 SPLICING

A. Furnish all reinforcing steel in the lengths shown.

B. Do not splice bars except where shown.

C. Stagger splices as far as possible.

D. Place and tie lapped splices ~~in the bars.~~ to ~~M~~maintain the ~~minimum distance~~ clearance to the surface of the concrete shown.

Commented [JC32]: Response to Ken Talbot:
"What does this mean?"
"Good question. Revised to focus on clear cover"

E. Do not allow lap splices in vertical column reinforcing bars unless shown.

F. Do not lap splice No. 14 and No. 18 bars.
1. Use mechanical splice couplers.

G. Use mechanical splice couplers when shown.
1. Follow the manufacturer's published recommendations for equipment and splicing procedures.

3.~~6~~5 FIELD BENDING

A. Do not field bend reinforcing steel unless shown.

B. Follow the authorized field bending procedures.

C. Use methods that do not damage coatings.

D. Do not heat the bars during the bending operations.

E. Do not bend bars partially embedded in concrete except as shown or pre-approved by the Engineer.
1. Do not field straighten or re-bend fabricated bent bars.

3.76 INSTALLATION OF DOWELLED ANCHORS

A. Use dowelled anchors according to the following:
1. Drill, brush, and clean all holes and install all doweled anchors according to manufacturer's published recommendations, applicable specifications, and as shown.
2. Do not install dowelled anchors until the holes are verified by the Engineer.
3. ~~Install dowelled anchors.~~ Test post-installed adhesive ~~dowelled~~ anchors ~~to 90 percent of the dowelled anchor yield strength~~ when shown, and as follows:
   a. Allow anchor adhesives to cure 48 hours before testing.
   b. Tension test according to ASTM E 3121 ~~E 1512~~.
      1) Test in the confined condition.
      2) Tension anchors to 90 percent of the anchor yield strength
      3) Hold tension at the specified load for at least 60 seconds.

Commented [JC33]: Test is only applicable to post-installed adhesive anchors

Commented [JC34]: Moved below the test subparagraph

Commented [JC35]: E 3121 allows for confined and unconfined test conditions. Confined is more appropriate for focusing on the capacity of the epoxy, not the quality of the concrete.

Commented [JC36]: Recommended by the British standards (BS8539 9.3 and Annex B.3) as stated by Hilti.

3.87 CONNECTIONS ~~PROCEDURE~~ USING GROUTED SPLICE COUPLERS

A. Use grouted splice coupler installers according to the submitted grouted splice coupler installer qualificaitons. ~~personnel familiar with installation and grouting of splice couplers and that have completed at least two successful projects in the last two years.~~

~~1. Train new personnel within three months of installation by a manufacturer's technical representative as an acceptable substitution for the experience.~~

Commented [JC37]: I don't think we have as much local experience as we used to.

Commented [JC38]: Need to add requirements for technical representative.

B Remove and clean all debris from the joints before grout application.

C. Keep bonding surfaces free from laitance, dirt, dust, paint, grease, oil, or any contaminants other than water.

D. Embed rebar anchor dowels to the minimum coupler embedment required by the manufacturer.

E. Saturate Surface Dry (SSD) all concrete ~~joint~~ surfaces in the joint before connecting the elements.

F. Use shims to verify that the reinforcing extensions are within the manufacturers recommended tolerance.

G. Maintain a minimum grout and sleeve temperature of 50 degrees F~~. Monitor the temperature of the covered grouted slice couplers~~ until the temporary bracing is removed.

~~H. Conform to the manufacturer's instructions for grout mixing, water to grout ratio, mixing time, and shelf life.~~

H~~I~~. Mix structural grout and coupler grout just before use according to the manufacturer's instructions.

I~~J~~. Follow the manufacturer's recommendations for coupler installation and grouting.

J~~K~~. Monitor the grouting operation to verify that all sleeves have been filled.

K~~L~~. ~~Verify that all sleeves are p~~Protect~~ed~~ sleeves from ~~any~~ vibration, shock, or other excessive movement until temporary bracing is removed.

L~~M~~. Conform to the following when installing couplers above a horizontal joint:

1. Determine the thickness of shims to provide the specified elevation within tolerance.
2. Follow non-shrink grout manufacturer's recommendations for mixing, joint surface preparation, and application.
3. Place non-shrink grout on the interface between the two elements being joined before setting the element.
   a. Crown the thickness of the grout toward the center of the joint so that the grout can be displaced outward as the element is lowered onto the joint.
   b. Prevent the grout from entering the coupler above elements by using grout dams or seals.
4. Set the element in place.
   a. Engage all couplers in the joint.
   b. Allow the grout to seep out of the joint.
5. Trowel off excess grout to form a neat joint once the element is set, plumbed, and aligned.
   a. Pack grout into any voids around the joint perimeter.
6. Flush out the coupler with clean potable water.

Commented [JC39]: Response to comment from Ken Talbot:
"The coupler is easy to meet this requirement but how do you do this for the rebar?"
"Revised to say "Saturate Surface Dry (SSD) all concrete surfaces in the joint before connecting the elements." "

Commented [JC40]: Line to "monitor" is unnecessary since "maintaining" the temperature would require monitoring.

Commented [JC41]: Redundant with the following references "according to the manufacturer's instructions.

Commented [JC42]: Response to comment from Ken Talbot:
"This seems difficult to verify - what if the word was changed from verify to "ensure" "
"Agreed, verify doesn't seem to be the right word. Will reword to "Protect sleeves from vibration, shock, or other excessive movement until temporary bracing is removed." "

7. Mix the special coupler grout according to the manufacturer's recommendations for methods and proportions of mix and water.
8. Make four sets of three 2 inch cube specimens for testing.
    a. Cure the specimens according to AASHTO T 106.
    b. Test one set of cubes for compressive strength to determine when to release bracing. Refer to this Section, Article 1.5 paragraph B4a2.
    c. Test one set of cubes at 28 days for acceptance.
    d. Store extra sets for longer term testing if necessary.
    e. Use a Department qualified laboratory to take the samples and perform the tests.
9. Pump the coupler grout into the coupler that is cast into the element.
    a. Start from the lower port.
    b. Pump until the grout is flowing freely from the upper port.
    c. Cap the upper port first and then remove the nozzle to cap the lower port.
10. Cure the joint according to the grout manufacturer's recommendations.

MN. Conform to the following when installing couplers below a horizontal joint:
1. Determine shim thickness to provide the specified elevation within tolerance.
2. Before setting the element:
    a. Mix the coupler grout paying strict attention to the manufacturer's recommendations for methods and proportions of mix and water.
    b. Clean debris from the interior using compressed air.
        1) Remove any rain water using a vacuum that can remove water from the confined space in the coupler.
    c. Place the coupler grout into the coupler by pouring or pumping.
    d. Place grout on the interface between the two elements being joined.
        1) Crown the thickness of the grout toward the center of the joint so that the grout can be displaced outward as the element is lowered onto the joint.
3. Trowel off excess grout to form a neat joint once the element is set, plumbed, and aligned.
    a. Pack grout into any voids around the joint perimeter.

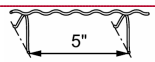
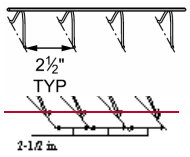
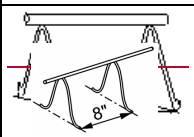
NO. Conform to the following when installing couplers in vertical joints (horizontal bar/coupler connection):
1. Establish a method to provide the specified elevations, alignment, and spacing within tolerance.

2. Use washers or seals to prevent mixing the joint grout and the coupler grout.
3. Apply epoxy adhesive to the interface between the two elements being joined.
4. Set the element in place.
   a. Engage all couplers in the joint.
5. Flush out the couplers with clean potable water once the element is set, plumbed, and aligned.
6. Mix the coupler grout paying strict attention to the manufacturer's recommendations for methods and proportions of mix and water.
7. Pump the coupler grout into the coupler that is cast into the element.
   a. Start from the port closest to the joint.
   b. Pump until the grout is flowing freely from the other port.
   c. Cap the port farthest from the joint first and then remove the nozzle to cap the other port.
8. Form the edges of the joint and place grout into the joint.
9. Cure the joint according to the grout manufacturer's recommendations.

3.98 FIELD QUALITY CONTROL

A. Inspect coated bars for damage to the coating after the bars are in place and immediately before concrete placement.

Table 1

Bar Supports							
Types and Sizes				Minimum Wire Sizes[2] and Geometry			
Symbol	Bar Support Illustration	Type of Support	Standard Sizes	Nominal Height	Carbon Steel		Geometry
					Top	Legs	
SB[1]		Slab Bolster	¾, 1, 1½, and 2 inch heights in 5 ft and 10 ft lengths	All	4 ga. Corrugated	6 ga.	Legs Spaced 5 inches on Center, Vertical Corrugations Spaced 1 inch on Center (See Note 3)
BB[1]		Beam Bolster	1, 1½, and 2 inch; over 2 inch to 5 inch heights in increments of ¼ inch lengths of 5 ft.	Up to 1½ inch incl.	7 ga.	7 ga.	Legs Spaced 2½inches on Center (See Note 3)
				Over 1½ inch to 2 inches incl.	7 ga.	7 ga.	
				Over 2 inches to 3½ inches incl.	4 ga.	4 ga.	
				Over 3½ inch	4 ga.	4 ga.	
BC		Individual Bar Chair	¾, 1, 1½, and 1¾ inch heights	All	-----	7 ga.	(See Note 3)
JC		Joist Chair	4, 5, and 6 inch widths and ¾, 1, and 1½ inch heights	All	-----	6 ga.	(See Note 3)
HC or HPC*	 * SAND PLATE NEED NOT BE COATED	Individual High Chair	2 inch to 15 inch heights in increments of ¼ inch.	2 inches to 3½ inches incl.	-----	4 ga.	Legs at 20 degree or less with vertical. When height exceeds 12 inches, legs are reinforced with welded crosswires or encircling wires (See Note 4)
				Over 3½ inches to 5 inches incl.	-----	4 ga.	
				Over 5 inches to 9 inches incl.	-----	2 ga.	
				Over 9 inches to 15 inches incl.	-----	0 ga.	
CHC		Continuous High Chair	Same as HC in 5 ft and 10 ft lengths	2 inches to 3½ inches incl.	2 ga.	4 ga.	Legs at 20 degree or less with vertical. All legs 8¼ inches on center maximum, with leg within 4 inches of end of chair, and spread between legs not less than 50 percent of nominal height. (See Note 5)
				Over 3½ inches to 5 inches incl.	2 ga.	4 ga.	
				Over 5 inches to 9 inches incl.	2 ga.	2 ga.	
				Over 9 inches to 15 inches incl.	2 ga.	0 ga.	

Notes and Bar Supports Table, see next page.

Commented [JC43]: All illustrations have been redrawn.

Notes:

1. Provide top wire on continuous supports, not otherwise designated as corrugated, which may be straight or corrugated at the option of the manufacturer.

2. Provide minimum wire sizes that are American steel and wire gauges.

3. Provide adequate stability against overturning. The leg spread measured between points of support on the minor axis must be at least 70 percent of the nominal height.

4. Provide adequate stability against overturning. The leg spread measured between points of support on the minor axis must be at least 55 percent of the nominal height.

5. Provide adequate stability against overturning and adequate load capacity. The leg spread measured between points of support on the minor axis must not exceed the minimum and maximum percentages of the nominal height as shown.

Table 2

Support Axis		
Nominal Height (inches)	**Distance Between Supports as a Percent of Nominal Height**	
	Minimum	**Maximum**
Under 4	70	No Limit
4	70	95
6	65	90
8	60	85
10	55	80
12	50	75
Over 12	50	75

END OF SECTION

Standards Committee Submittal Sheet

Name of Preparer: Justin Wilstead

Title/Position of Preparer: Standards and Innovation Manager

Specification/Drawing/Item Title: Traffic Control

Specification/Drawing Number: 01554

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

Updated language to include MASH (Manual on Assessing Safety Hardware) reference and requirements to meet FHWA. Updated definition to include TPAR (Temporary Pedestrian Access Route). Corrections to clarify intent of previous spec language and better organize content. Added language that corresponds to the proposed TC 6 series drawings.

Previous 01554 supplemental has been included in spec rewrite.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

A new M&P standard item will be created to cover TPAR.

#	**015547###**	**Temporary Pedestrian Access Route (TPAR)**	**Lump**
	Amount Paid		**When Paid**
	25% of the bid item amount		With first estimate
	Remaining portion of bid item paid as a percentage of the contract completed		With each subsequent estimate

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.

Existing acceptance and documentation still applies.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements
   N/A

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)
   N/A

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?
   N/A

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).
   - **Addition of TPAR – See cost impacts for proposed TC-6 series drawings**
   - **MASH Compliance – all contractors supplying precast barrier will be required to change out the barrier used on UDOT projects to achieve MASH compliance. The prior (NCHRP-350) precast barrier will be phased out of use prior to its natural lifespan. This is done to increase safety on UDOT projects, and to reduce the time period in which UDOT and contractors have to manage a mixed barrier population on UDOT jobs. This will cause an increase in contractor overhead as they will be required to cut short the lifespan of the existing barrier population.**
   - **Training requirements – may require contractors to provide TCT training (TCT training now required to sign traffic control inspection forms). Estimate one or two additional employees to be trained in TCT per project. TCT training cost is approximately $200 - $250 per employee.**

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).
   MASH Compliant precast barrier will include roughly 20-25% more material than the prior standard. Material cost for barrier will likely raise by that much, as will shipping. Labor cost for installation should be similar to existing.

   We expect barrier installation costs to be increased by approximately 30%. Labor costs may be increased due to the use of shorter sticks of barrier.

3. Life cycle cost.
   Existing traffic control devices other than precast barrier that meet previous crashworthiness requirements are allowed to be used until December 31, 2022. New devices manufactured after December 31, 2019 will be required to meet MASH criteria. This will allow contractors to phase out old devices through their normal life cycle.

   It is anticipated that temporary ramps may be reused at different locations. Depending upon the type/material of the temp ramp that is constructed or procured, the life cycle will differ.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

Proposed updates to the 01554 spec will clarify the intent of the specification as well as include MASH crashworthiness requirements. It will also help construction management teams enforce the current ADA/PROWAG requirements that are in the TC series standard drawings and 01554. The result is improved safety and accessibility in work zones

H. Safety Impacts?

Proposed updates will increase safety for both motorists and pedestrians in the work zone with the addition of MASH crashworthiness requirements. Providing additional guidance for routing pedestrians in the work zone will also increase safety by providing proper routing options during construction.

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

Feedback from the construction crews during the FHWA stewardship work zone reviews has shown that there is a need to clarify the intent of routing pedestrians in work zones. Improvements have been made over the past few years, but it is clear that there is a need to provide additional guidance in order to provide the construction crews the tools needed to enforce what the standard drawings and specifications are currently requiring.

REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
Kirk Thornock	01554	No comments		
Janice	1554	No comment		
Michael A. Adams	01554	No Comment		
Nathan Schellenberg	01554	In section 1.9.B.1 the traffic control maintainer certification can be from either UDOT or ATSSA but in 1.9.B.6.a it requires all traffic control inspections to be performed by someone with ATSSA Certification. The inspections should also be able to be performed by the traffic control maintainer who can be certified by either UDOT or ATSSA	UDOT is using ATSSA for the certifications, so we are consistent internal and external. UDOT does not certify a Maintainer without the ATSSA certification.	Justin Wilstead
Daryl Friant	01554	Section 01554 3.8(D)(1)(d) is a little confusing. It states that a traffic slow down is required if necessary to enter the lanes. This is to subjective to be a requirement. I would recommend changing the language to say "implement a Traffic Slow Down if necessary to enter the travel lanes to deploy or reset TPRS."	Will update with wording from comment.	Justin Wilstead
Ryan Ferrin	01554	Change page numbers at bottom to read "15 of 17", "16 of 17", "17 of 17", etc.	When the track changes are accepted, the total number of pages is 13. Will verify in final draft for correct number of pages.	Justin Wilstead
Vincent Liu	No comments	No comments		
Marjorie Rasmussen	1.4	The removal of peak hour notes may affect the permits group. Please verify with them if they are relying on this definition in any of their documents so they can update if needed.	Verified with Permits that they are still using this language. Will leave in spec.	Justin Wilstead
FHWA	1.7A2	should there be a "must" in that sentence?	Will add "must" in the sentence.	Justin Wilstead
James Corney	1.7	Change "crashworthiness requirements" to "crashworthiness criteria" so that the same language is used throughout. (Criteria seems to be the word used by the joint implentation agreement)	After coordination with James and Ray, section has been reworked for proper use of requirement vs criteria.	Justin Wilstead
James Corney	1.7	Swap paragraphs A and B for clarity. Define "Crashworthiness Criteria" before we require it.	Will swap paragraphs A and B.	Justin Wilstead
James Corney	1.8 A7a	Delete since this is covered in more detail in 3.8.	Will delete	Justin Wilstead
James Corney	2.1 B	Delete first use of "lights" "Equip with at least two rotating, oscillating, or strobe lights."	Will delete first use of lights.	Justin Wilstead
James Corney	2.3 D & E4	Delete "NCHRP-350" reference. Category 3 devices are described in 1.7 A for crashworthiness criteria.	Deleted NCHRP 350 references.	Justin Wilstead
Michelle Page	TPAR M&P	Not sure setting the M&P up for 25% payment with the first estimate makes sense for this type of work. Usually the contractor will submit TC Plans during the first part of a project, then start work, but may not be impacting pedestrian access until later in the project. This M&P ties the item of work to project progress which may not correlate with the TPAR. Another option would be a lump sum (similar to environmental fence) that allows for percent complete payment, includes materials, installation, maintenance and removal of the TPAR. Which may be a short duration or for the entire timeframe of the project. A percent complete approach allows the item to be paid for specific to when it is started and completed.	Per our phone conversation, we will continue to work through the wording for the M&P item. Percent complete approach may be the best way to handle this item, but want to get input for a few stakeholders.	Justin Wilstead
Kelly Barrett	NA	No Comment		
Bill Townsend	NA	No Comment		
Fred Doehring	1.9 D	Is the TCM responsible to ensure that the ADA devices are in proper order? If so, should we include that requirement here? If they are not, who is?	Revised 1.9 D1 to include TPAR devices.	Justin Wilstead
Fred Doehring	3.1 D	I know we don't currently do this but what about maintaining the TPAR? Should we clearly require the Contractor to remove snow and ice from the TPAR?	Revised 3.1 D to include removing snow and ice from TC devices, TPAR devices and Pedestrian Access Route.	Justin Wilstead
ACEC	01554	The proposed 01554 – Traffic Control Supplemental Specification, Section 1.8.A.3 requires the contractor's traffic control plan to "Provide for the safe and efficient movement of pedestrians and cyclists when existing facilities are disrupted, closed or relocated by a work zone." The proposed TC 6 series of supplemental drawings is a great step forward to specifically address pedestrians – is UDOT considering or developing supplemental drawings or guidance of some type to address impacts to cyclists?	These drawings are the first round of improving active transportation in work zones. Additional guidance will be developed for cyclists in work zones in the future.	Justin Wilstead
Brett Slate	01554	No Comments		
Charles Mason-Hill	01554 1.1.A and 1.5.A and 1.7.A.2	1.1.A, and 1.5.A uses Traffic Control Plan- do these need to be changed to match the rest of the document? In 1.7.A.2 is the word must missing?	Will update 1.1 A and 1.5 A to match rest of document and add "must" to 1.7 A.2	Justin Wilstead
Ray Cook	01554, 1.1	Reword 1.1A: Temporary traffic control requirements, signs, devices, and personnel necessary to control vehicular and pedestrian traffic flow in a safe and efficient manner in construction zones. Delete 1.1 B.	Will update 1.1 A and delete 1.1 B.	Justin Wilstead
Ray Cook	01554, 1.4 (deleted A)	If the definition for peak hours is being moved to another specification, make sure it gets there. If it is moving to another standard specification, it should be part of this agenda item.	Definition for Peak Hours will remain in the 01554. Permits uses this definition.	Justin Wilstead
Ray Cook	01554, 1.5 C	1.5 C duplicates 01450 1.7 B4 and should be deleted.	Will delete 1.5 C	Justin Wilstead

Ray Cook	01554, 1.6 A	Reword: “At least the following must attend a meeting before beginning construction at the time and location determined by the Engineer.”	Will reword 1.6 A	Justin Wilstead
Ray Cook	01554, 1.7	Revise the article title (Certifications) to something more appropriate (perhaps Device Crashworthiness). According to the FHWA website and as stated in the eligibility letters, “eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use." Therefore, FHWA does not certify devices. Does documentation need to be submitted? If so, add to Submittals article. This article more appropriately belongs in Part 2 since it is not about certifications and describes device requirements.	Revised article title. Documentation does not need to be submitted.	Justin Wilstead
Ray Cook	01554, 1.7	Use correct terms consistently. 1.7 A refers to crashworthiness requirements, which I assume is referring to 1.7 B; however, 1.7 B is entitled Crashworthiness Criteria. 1.7 B1 refers to MASH 2016 crashworthiness criteria, and 1.7 B2 refers to NCHRP 350 crashworthiness requirements.	After coordination with James and Ray, section has been reworked for proper use of requirement vs criteria.	Justin Wilstead
Ray Cook	01554, 1.7 B	Reverse the order of B1 and B2. 1.7 B1 is ambiguous. (Does “new device” refer to when it was manufactured or when it was acquired?) Reword 1.7 B1: “Meet MASH 2016 crashworthiness criteria for devices manufactured after December 31, 2019.” Make sure that “crashworthiness criteria” is the correct term. 1.7 B2: Change “before” to “on or before” to include devices manufactured on 12/31/19. Also, replace the dash in NCHRP-350 with a space.	Order has been reversed. Wording has been updated per your comment..	Justin Wilstead
Ray Cook	01554, 1.9	D1: Change “Oversees” to “Oversee” for consistency. D4: Change “Remains” to “Remain” for consistency. D6c2: Delete “Conduct inspections a minimum of” for consistency. D6d2 is inconsistent with D6d and D6d1. It should be an item included in the documentation, rather than a requirement. D6: It is unclear whether the inspections in D6b and D6c are duties of the TC Maintainer since D6a has someone else inspecting. It seems like D6a, b and c belong elsewhere. Also, does it make sense that one person performs the inspection and another documents it?	Changed "Oversees" to "Oversee" and "Remains" to "Remain". Reorganized D6c2 to create consistency. Reorganized and reworded D6d2 for consistency Reorganized D6 to clarify duties of the maintainer.	Justin Wilstead
Ray Cook	01554, 2.3 E4	Add “to” after “Refer”	Added "to".	Justin Wilstead
Ray Cook	01554, 3.1, 3.3	3.1 A1: Capitalize “Engineer.” 3.1 A1a: Acceptance should be authorization. Note that authorization is required to be in writing and that elsewhere changes to the Traffic Control Plan require resubmittal for review. The way that A1a is worded suggests that a resubmittal of the Traffic Control Plan is not required. The Engineer's authorization should be the result of a TCP resubmittal. 3.1 B: Revise “per” to “according to” 3.1 D: Delete “all.” 3.1 D1: Delete “all.” 3.3 C1a: Revise “prior to” to “before.”	Capitalized Engineer. Revised "acceptance" to "authorization"Revised "per" to "according to". Deleted "all". Revised "prior to" to "before". 3.1 A1 - reworded to clarify intent. Clarified new tc plans need to be submitted for review.	Justin Wilstead
Ray Cook	01554, TPAR M&P	M&P provided does not relate to TPAR. It duplicates the standard traffic control pay item. Is the intent to create a separate pay item to cover TPAR or is the intent to include TPAR in the overall traffic control pay item? If the former, pay item name needs to change and the description made consistent with TPAR M&P. If the latter, no M&P change is required.	In the submittal sheet, I used the correct name for the TPAR M&P language. In the TPAR M&P PDF, I missed changing the name. The intent is to have a pay item for TPAR separate from Traffic Control.	Justin Wilstead

Supplemental Specification
2017 Standard Specification Book

SECTION 01554

TRAFFIC CONTROL

Delete Section 01554 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. ~~Traffic Control Plan requirements and materials and labor necessary for implementation.~~Temporary traffic control requirements, signs, devices, and personnel necessary to control vehicular and pedestrian traffic flow in a safe and efficient manner in construction zones.

~~B. Traffic Control Maintainer and Flagging.~~

B~~C~~. Work zone traffic control devices, arrow boards, and pilot cars.

1.2 RELATED SECTIONS

A. Section 00555: Prosecution and Progress

B. Section 02845: High Tension Cable Barrier

C. Section 02890: Retroreflective Sheeting

1.3 REFERENCES

A. AASHTO Roadside Design Guide, Current Edition

B. American National Standards Institute (ANSI)

C. Americans with Disabilities Act

D. ATSSA: American Traffic Safety Services Association
Quality Standards for Work Zone Traffic Control Devices

E. Department Flagger Training Handbook

F. Department Guidelines for Crash Cushions and Barrier End Treatments

G. International Safety Equipment Association (ISEA)

H. NCHRP- Report 350: Recommended Procedures for the Safety Performance Evaluation of Highway Features

I. Utah Manual on Uniform Traffic Control Devices (Utah MUTCD)

J. MASH 2016: AASHTO Manual for Assessing Safety Hardware published 2016

1.4 DEFINITIONS

A. Peak Hours –Peak hours are 6:30 a.m. to 9:00 a.m. and 3:30 p.m. to 7:00 p.m., Monday through Friday unless otherwise defined by the Engineer or in the Special Provision for Section 00555.

B. Traffic Slow Down – An isolated planned event where traffic on a highway is reduced in speed to provide a gap for work to proceed.
1. Examples include the crossing of the highway with heavy equipment or the adjustment of traffic control devices.

C. TPRS – Temporary Portable Rumble Strips – An array of 3 heavy rubber strips that create noise when they are run over and are used to alert drivers to the presence of road construction.

B. TPAR – Temporary Pedestrian Access Route – A temporary detectable pedestrian route that is provided when existing routes are disrupted, closed or relocated and includes accessibility features present in the existing facility.

C. TPRS – Temporary Portable Rumble Strips – An array of three heavy rubber strips that create noise when they are run over and are used to alert drivers to the presence of road construction.

D. Traffic Slow Down – An isolated planned event where traffic on a highway is reduced in speed to provide a gap for work to proceed.
1. Examples include the crossing of the highway with heavy equipment or the adjustment of traffic control devices.

1.5 SUBMITTALS

A. Traffic Control Plan for review no later than the fourth Wednesday following Notice to Proceed.
1. 11 inches x 17 inches format prepared using CAD software.
2. Refer to this Section, Article 1.8 Paragraph G for required documentation.

~~3. Refer to this Section, Article 3.1 Paragraph A for modified plan submittal requirements.~~

A. Traffic control plan for review before beginning work.

1. Include at least the following:

a. Traffic control measures for each phase of work in sufficient detail to provide for the safe and efficient movement of traffic, pedestrians, and bicycles during construction.

1) Describe equipment, devices, and implementation instructions.

b. Work elements to be accomplished in each phase.

c. Details for each change to traffic control that is planned for the duration of the project.

d. Expected duration of each traffic control configuration.

e. Length of Need (LON) for temporary barriers.

f. Taper lengths, lane shift widths, device spacing, and sign locations for temporary and existing signs.

g. Removal or masking of traffic control elements that conflict with temporary traffic control measures, such as existing traffic signs, traffic signals, and markings.

h. Worker parking, work vehicle access, and equipment access.

i. Location and hours of use for TPRS.

j. TPAR and devices for pedestrian access.

2. Provide supporting engineering calculations.

3. Provide the seal of a Professional Engineer licensed in the State of Utah on drawings and calculations.

B. Traffic Control Inspection forms weekly for information.

1. Submit on a day and time acceptable to the Engineer. ~~Refer to this section, Article 1.9, paragraph C10.~~

~~C. Each phase of construction must use an authorized Traffic Control Plan. Submit an updated plan to the Engineer for review if a construction phase is proposed that is not covered by the Traffic Control Plan.~~

~~D. Submit plans to the Engineer 10 working days before the Traffic Control Plan is to be implemented.~~

~~E. Do not begin work until the Traffic Control plan is authorized for use and has been fully implemented.~~

~~F. Implement changes required to meet Department Standard Specifications, Standard Drawings and Utah MUTCD.~~

~~1. Comply with this Section, Article 1.6, paragraph A1.~~

1.6 REQUIRED MEETING

A. At least the following must attend a meeting before beginning construction ~~Prior to start of construction A~~attend a meeting ~~a~~ at the time and location determined by the Engineer:
   1. Contractor's Traffic Control Designer
   2. Contractor's Traffic Control Maintainer

1.7 DEVICE CRASHWORTHINESS~~CERTIFICATIONS~~

A. Crashworthiness requirements.
   1. Devices manufactured on or before December 31, 2019 and that meet NCHRP 350 crashworthiness criteria may be used until December 31, 2022.
   2. Devices manufactured after December 31, 2019 are required to meet MASH 2016 crashworthiness criteria.

B~~A~~. Devices in the following FHWA device category are required to meet crashworthiness requirements:~~Use devices and systems that meet NCHRP-350 Report crash test requirements as defined in the four categories by the Federal Highway Administration.~~
   1. Category 1 - ~~(~~cones, barrels and delineators~~)~~
   2. ~~,~~ Category 2 - ~~(~~barricades and sign stands~~) and~~
   3. ~~-~~Category 3 - ~~(B~~barriers, crash cushions and truck mounted attenuators~~) – Must meet NCHRP-350.~~

C. Devices in the following FHWA device category are not required to meet crashworthiness requirements:
   1~~2~~. Category 4~~—~~ - a~~A~~rrow boards and portable variable message signs ~~do not have to meet NCHRP-350 Report test requirements.~~

   ~~B Devices may meet MASH 2016 criteria instead of NCHRP-350 Report requirements.~~

1.8 TRAFFIC CONTROL REQUIREMENTS

A. Meet the following requirements for traffic control and document them in the traffic control plan:
   1. Meet the requirements in the TC series Standard Drawings, Utah MUTCD, and the Americans with Disabilities Act.
   2. Provide for the safe and efficient movement of traffic.
      ~~a. Plan must m~~Meet or exceed all standards set in the Utah MUTCD, ~~Standard Drawings, Standard Specifications, and other contract documents for safe movement of traffic.~~

~~2. Provide for the efficient movement of traffic.~~

a. Address expected delay with the Project Public Involvement Team or the Region Communications Manager if the project does not have a Public Involvement Team.

3. Provide for the safe and efficient movement of pedestrians and ~~bicycles~~cyclists~~.~~ ~~W~~when existing facilities are disrupted, closed or relocated by a work zone.

a. Provide ~~D~~detectable temporary facilities that include accessibility features consistent with the features present in the existing pedestrian facility

~~a. Meet all the requirements of the Americans with Disabilities Act and the Utah MUTCD. Follow all standards set in the Standard Drawings, Standard Specifications and other contract documents for safe movement of pedestrians and bicycles through the work zone.~~

4. Provide concrete barrier, crash cushions and attenuators including:

a. Protection as required for hazard mitigation for workers. Refer to TC 3 Series Standard Drawings.

b. Protect all hazards to motorists within the appropriate AASHTO clear zone including bridge parapets, barrier blunt ends, poles, and large equipment. Refer to the Department Guidelines for Crash Cushions and Barrier End Treatments for acceptable devices.

5. Provide temporary pavement markings and pavement marking removal.

6. Incorporate traffic signal timing and detection plans as determined by the Engineer.

7. Incorporate TPRS when there is a change in the width, alignment or number of lanes on freeways or interstates with 2 lanes in a single direction.

~~a. Use TPRS only when the traffic control maintainer or other observer is present to adjust TPRS when they shift under traffic.~~

~~1.9 TRAFFIC CONTROL PLAN REQUIREMENTS~~

~~A. Provide a Traffic Control Plan signed and sealed by a professional engineer licensed in the State of Utah.~~

~~B. Format and document the Traffic Control Plan to include all information necessary to successfully implement, including:~~

~~1. Describe each phase of work, including all elements of work to be accomplished in each phase.~~

~~2. Show each change to traffic control that is planned for the duration of the project,~~

~~3. Document expected duration of each traffic control configuration.~~

~~4. Use CAD for any drawings.~~
~~5. Use the same or greater level of detail as in the Utah MUTCD and TC Series Standard Drawings.~~
~~6. Calculate and document Length of Need (LON) for temporary barriers.~~
~~7. Show taper lengths and lane shift widths, device spacing, sign locations for temporary and existing signs.~~
~~8. Document removal or masking of things such as existing traffic signs, traffic signals, and markings.~~
~~9. Document worker parking, work vehicle access, and equipment access.~~
~~10. Document the location and hours of use for TPRS.~~

1.~~9~~10 TRAFFIC CONTROL MAINTAINER

A. Provide a traffic control maintainer to install, maintain and remove temporary traffic control devices according to the authorized traffic control plan.

B. Qualifications:
1. Certified by the Department or by the American Traffic Safety Services Association (ATSSA) ~~with the Department endorsement~~ as a Traffic Control Technician. A list of certifying agencies is available at http://www.udot.utah.gov/go/standardsreferences

CB. Authority

1. Obtains and uses all labor, equipment, and materials necessary to maintain traffic control.
2. Changes traffic control operations according to the authorized traffic control plan.

DC. Responsibilities and Duties

1. Oversees all traffic control operations and TPAR devices.
2. Will bBe present and an active participant during the installation, maintenance, and removal of Ttemporary Ttraffic Ccontrol Ddevices.
3. Implements the authorized Ttraffic Ccontrol Pplan.
4. Remains available 24 hours a day, seven7 days a week and can be on-site within 30 minutes of notification.
5. Corrects deficiencies immediately upon notification from the Engineer.
6. Manage traffic control inspections.
   a. Document the traffic control inspections on a form acceptable to the Engineer. Inspect at least four times each day with at least one of the inspections conducted during nighttime hours:
      1) Include at least the following:
         a) Assessment of device quality.
         b) Items in compliance with the authorized traffic control plan.
   b. A person with the ATSSA Traffic Control Technician (TCT) certification performs the inspections and signs the documentation.
      1) Persons that have passed TCT certification but do not have the required experience may also perform the inspections and sign documentation.
   c. When construction work is occurring, iInspect at least four times each day with at least one of the inspections conducted during nighttime hours when construction work is occurring:

      1)a. Before beginning of shift,
      2)b. At mid-shift,
      3)c. Half-hour after shift ends, and
      4)d. At the midpoint of the off-shift period.
   d. Conduct traffic control inspections twice each day Wwhen construction is not occurring, but traffic control is present, conduct traffic control inspections twice each day.
      1) Once during daylight hours.
      2) Once during nighttime hours.

3) At least 8 hours between inspections.

7. Coordinate project traffic control with emergency services and local law enforcement agencies.

~~8. Inspect and document traffic control inspections twice each day when no construction work is being done.~~

~~a. Once during daylight hours and once during nighttime hours.~~

~~b. Conduct inspections a minimum of eight hours apart.~~

~~9. Complete a daily record of traffic control activities using a form acceptable to the Engineer.~~

~~10. Submit inspection and activities forms to the Engineer each week on a day and time acceptable to the Engineer.~~

8~~11~~. Monitor traffic queue lengths and adjust advanced warning signs to provide adequate warning of the actual back of queue resulting from construction activities.

9~~12~~. Adjust the TPRS as necessary to maintain proper alignment, spacing and location.

10. Adjust the TPAR devices as necessary to maintain a detectable route that is consistent with the accessibility present in the existing pedestrian facility.

~~1.101 MAINTENANCE OF WORK ZONE TRAFFIC CONTROL~~

~~A. Implement and maintain traffic control according to the Traffic Control Plan.~~

~~1. If changes are required to Traffic Control Plan notify Engineer and submit updated Traffic Control Plan. Updated Traffic Control Plan must be accepted before implementation.Implement changes to traffic control required in order to meet UDOT Standard Specifications, Drawings, and Utah MUTCD.~~

~~2. If immediate changes are required to the traffic control plan to improve or maintain the safety of the work zone, make the changes immediately and notify the engineer. Document the changes and engineers acceptance of the changes.Coordinate changes to traffic control and the Traffic Control Plan with the Engineer prior to implementation.~~

~~B. Meet all requirements of this Section, Article 1.9 and 1.10 when traffic control devices are required to be in place when work is not actively occurring, including overnight, weekends and holidays.~~

~~C. Meet the acceptable classification as identified by Quality Standards for Work Zone Traffic Control Devices published by ATSSA for traffic control devices.~~

~~1. Wash devices as needed to meet ATSSA Quality Standards. so that the proper retroreflectivity is maintained.~~

~~D. Maintain traffic control devices during and after all snow plowing operations.~~

~~1. Clear snow away from all traffic control devices so that the devices function as intended.~~

~~E. Failure to maintain traffic control as required in this Section, Article 1.10 A through C may result in reduced payment for traffic control or liquidated damages as provided for in this Section, Article 1.11~~

1.1012 ~~PAYMENT PROCEDURES~~PRICE ADJUSTMENTS

~~A. Partial Payments – Based on the percentage of the project completed, excluding the cost of traffic control.~~

A~~B~~. ~~Price Adjustments~~

~~1.~~ The Department reduces payment when traffic control is not in compliance with the authorized t~~T~~raffic c~~C~~ontrol p~~P~~lan or when the Contractor fails to meet all requirements cited or referenced in this specification.

1a~~.~~ The amount per day by which the Contractor's compensation will be reduced is calculated using the daily charge for Calendar Day in the Schedule of Liquidated Damages in Table of Section 00555 or the Contract lump sum bid price for Traffic Control divided by the number of contract days, whichever is greater.

PART 2 PRODUCTS

2.1 PILOT CAR

A. Equip with a retroreflectorized sign.

1. Refer to Section 02890.
2. Utah MUTCD sign G20-4.

B. Equip with at least ~~minimum of~~ two rotating ~~lights~~, oscillating, or strobe lights.
   1. Minimum 4 inch diameter/width and minimum 6 ft mounting height.
   2. Yellow color.

2.2 FLAGGER EQUIPMENT AND CLOTHING

A. Refer to the Department's Flagger Training Handbook.

~~B. Refer to TC Series Standard Drawings.~~

B~~C~~. Safety Clothing
   1. Flagger vest and hard hat – Orange, red-orange, or fluorescent version of these colors.
      a. Wear safety apparel meeting the requirements of ANSI/ISEA "American National Standard for High-Visibility Apparel and Headwear" or equivalent revisions and labeled as meeting the current ANSI/ISEA publication year, standard performance for Class 3 risk exposure.
      b. Hard hat with 10 square inches of white or strong yellow-green retroreflective tape placed around the base of the hard hat and visible to traffic from all directions.

2.3 TRAFFIC CONTROL SIGNING AND DEVICES

A. Signs
   1. Comply with Section 02890.
   2. Comply with TC Series Standard Drawings.
   3. Comply with SN Series Standard Drawings when using post mounted signs.

B. Channelizing Devices
   1. Comply with TC Series Standard Drawings.
   2. Comply with Section 02890.

C. Precast Concrete Barrier
1. Comply with TC Series Standards Drawings.
2. Use an approved construction zone attenuator or permanent style end sections, as listed in Department Guidelines for Crash Cushions & Barrier End Treatments.
a. Use a construction zone attenuator when approach ends of temporary precast barrier are within the maximum AASHTO clear zone.
1) Use AASHTO Roadside Design Guide to determine proper clear zone distance requirements
2) Refer to the CC Series Standard Drawings and manufacturer's recommendations to install crash cushions.

D. Use properly rated truck-mounted attenuator for the pre-construction posted speed limit ~~prior to construction~~.
1. ~~NCHRP-350~~ Test Level 2 for speeds 45 mph or less.
2. ~~NCHRP-350~~ Test Level 3 for speeds greater than 45 mph.
3. Do not use a truck-mounted attenuator (TMA) to protect blunt end for more than 72 hours.

E. Maintain cable barrier and anchor systems during construction.
1. Protect existing hazards when cable barrier and anchor systems are rendered inoperable by work.
a. Address barrier length of need for the hazard.
2. Maintain the required tension in the cable barrier system when the cable is disconnected by installing anchor systems on each end of the disconnect.
a. Do not cut cable.
~~1~~3.~~)~~ Disconnect cable at cable splice or anchor system locations only.
4~~2~~.
~~3.~~ Install ~~NCHRP 350~~ approved terminal compatible with existing cable system. Refer to Section 02845.
a. Tension cable to manufacturer's requirements.

2.4 ARROW BOARD

A. Comply with all standards as specified in the Utah MUTCD, Section 6F.61 Arrow Boards.

B. Refer to the TC Series Standard Drawings and the Utah MUTCD**.**

2.5 TEMPORARY PORTABLE RUMBLE STRIPS

A. Roadquake 2 Series
Temporary Portable Rumble Strip manufactured by:
Plastic Safety Systems
2444 Baldwin Road
Cleveland, OH 44104
(800) 662-6338

B. Space and locate TPRS as shown in TC Series Standard Drawings.

2.6 TEMPORARY WALKWAY AND RAMPS

A. Refer to TC Series Standard Drawings and the Utah MUTCD

PART 3 EXECUTION

3.1 GENERAL

A. ~~A. Follow the authorized Traffic Control Plan.~~Implement and maintain traffic control according to the authorized traffic control plan.
1. Make changes immediately and notify the E~~e~~ngineer ~~I~~if traffic control changes that deviate from the authorized traffic control plan are required to make the work zone safe for workers or the traveling public~~, make the changes immediately and notify the engineer~~.
~~a. Document the changes and eEngineers acceptance of the changes.~~2. Update the traffic control plan with the changes and resubmit for review.
~~2. Submit an updated traffic control plan for review Ffor changes to the traffic control plan without immediate safety impacts, submit an updated traffic control plan for review.~~

B. Maintain traffic control as required by the authorized traffic control plan when traffic control is in place and work is not ~~–~~actively occurring, including overnight, weekends and holidays. Inspect according to this Section, Article 1.9.

C. The ATSSA publication Quality Standards for Work Zone Traffic Control Devices identifies different levels of device quality. Meet the acceptable level for all traffic control devices.
1. Wash or replace devices as needed to meet acceptable level.

D. Maintain traffic control devices during and after all snow plowing operations.

1. Clear snow and ice away from ~~-~~the following:~~all traffic control devices so the devices function as intended.~~

a. Traffic control devices to function as intended.

b. TPAR devices to function as intended.

c. Pedestrian access route to maintain a safe surface.

3.2 FLAGGING

A. Flaggers must have a current Utah flagging certificate and must present proof of certification upon request by the Department.

1. Acceptable certifications.~~-~~ Refer to http://www.udot.utah.gov/go/standardsreferences for a list of acceptable courses taught by certified instructors.

3.3 TRAFFIC CONTROL SIGNING AND DEVICES

A. Use pre-construction posted speed limit ~~prior to construction~~ to compute sign spacing, taper lengths, buffer zones, and construction clear zone.

1. Use plastic drums or directional barricades for lane closure taper devices for speeds 50 mph and greater.
2. Refer to the TC Series Standard Drawings for use of cones or tubular markers at night.

B. Use pre-construction posted speed limit during construction to compute the tangent spacing for channelizing devices.

C. Remove all traffic control devices from site of work that are no longer necessary for the authorized t~~T~~raffic c~~C~~ontrol p~~P~~lan.

1. Remove traffic control devices from the roadway a distance twice that of the Work Clear Zone if they will be used within 24 hours of the daily work stoppage and are not required for immediate traffic control. Refer to the TC Series Standard Drawings.
   a. Obtain written permission from property owner before ~~prior to~~ storing traffic control devices on private property.
   b. Crashworthy traffic control devices that are placed into service with a barrel mover or similar device may be left on the hard surface shoulder if they are staged to be placed with the barrel mover within 48 hours and do not encroach into the travel lanes.
2. Cover post mounted signs completely with an opaque and durable covering when the signs are not applicable.

3.4 ARROW BOARD

A. May substitute Type C units for Type B units. Refer to the TC Series Standard Drawings.

B. Do not substitute Type B units for Type C units.

C. Remove Arrow Board from the site of work when not needed for the control of traffic within a four-hour period.

3.5 TRAFFIC SIGNALS

A. Use uniformed police officer when construction activities are impacting an operating signalized intersection.

B. Use of flaggers at traffic signals permitted when the signals have been turned to red flash mode or are inoperable.
   1. Control each approach by separate flaggers.
      a. Flaggers can control only two lanes of approach traffic.
         1) Third lane control permitted when left or right turn bays present.

C. The Department will make all changes to traffic signal operations.

3.6 CONSTRUCTION ZONE SPEED LIMIT REQUIREMENTS

A. Obtain approval for regulatory and advisory speed reductions through the Engineer.
   1. Use speed reductions only during impacted times and areas.
   2. Restore ~~existing~~ pre-construction regulatory speed limit ~~prior to work~~ at locations where traffic is not being impacted by work activities.
   3 Refer to http://www.udot.utah.gov/go/standardsreferences for policy information.
   4. Refer to TC Series Standard Drawings.
   5. Use speed reduction only when construction activities impact traffic.
   ~~6. Restore regulatory speed limit at locations where construction activities are not impacting traffic.~~
   6~~7~~. Refer to SN Series Standard Drawings for post mounted sign requirements.

3.7 LIMITATION OF OPERATIONS

A. Traffic Slow Down
   1. Notify and obtain approval from the Department and law enforcement a minimum of 48 hours prior to slow down.
   2. Use a Highway Patrol Trooper, or other law enforcement officer, in a marked vehicle with overhead flashing lights to conduct the slow down.
   3. Use the officer in the marked vehicle to slow down one or two lanes.
      a. Use, in any combination either, contractor-supplied vehicles equipped with overhead amber flashing lights or additional officers in marked vehicles at the rate of one vehicle per lane thereafter for all lanes of the highway to affect the traffic slow down.
   4. Additional vehicles as described in this article may be used in the traffic slow down to supplement the law enforcement vehicle when required by the officer.
   5. The duration of any traffic slow down is not to exceed five minutes or as approved by the Region Traffic Engineer and communicated through the Engineer.

3.8 TEMPORARY PORTABLE RUMBLE STRIPS (TPRS)

A. Clean road surface with broom or blower to remove all gravel, sand, dust, or other debris.

B. Assemble modular pieces into strips that match the width of the travel lane as closely as possible.
   1. Follow manufacturer's recommendations so that pieces are properly interlocked.

C. Place TPRS perpendicular to traffic and centered in lane.
   ~~1. Refer to project details for array placement, spacing, and signing requirements.~~
   1~~2~~. Follow manufacturer's recommendations and TC series standard drawings for installation and product orientation.
   2~~3~~. Do not glue, nail, or otherwise affix TPRS to the road surface.

D. Place TPRS at the same time as other traffic control devices, prior to work taking place.
   1. Maintain the TPRS in proper condition, alignment, spacing, and location.
      a. Set TPRS perpendicular to the travel lane.
         1) Adjust TPRS when any one rumble strip becomes skewed by a distance of 3 ft or more. Skew distance

is the distance parallel to direction of travel between the ends of the strip.

2) Adjust the TPRS if the parallel distance between the individual rumble strips decreases by 5 ft or more.

3) Temporary paint marks may be placed to give reference of original locations.

b. Make adjustments to TPRS as often as necessary during working hours, but at least during each traffic control inspection.

1) Adjustments to TPRS must be made within 30 minutes of discovery or notification of misalignment.

c. Remove TPRS during non-working hours.

d. Implement a Traffic Slow Down if necessary to enter the travel lanes to deploy or reset TPRS.~~r~~

E. Do not use TPRS during snow events, or at temperatures outside of the manufacturer's recommendations.

3.9 LANE CLOSURES

A. Notify the Engineer in advance of every lane closure.

1. Provide notification:

a. As soon as it is known that a lane closure is necessary to execute the work, but not less than 72 hours before the closure begins.

b. As soon as practical when the schedule, location, or need for an upcoming lane closure arises or changes.

1) Contact the Engineer immediately in person, by email, by phone call, or by text message.

2. Include at least the following:

a. The route,

b. The beginning and ending mileposts or mile markers,

c. Number of lanes to be closed,

d. Direction of the closure,

e. The date and time of the beginning of closure, and

f. The date and time of the ending of the closure.

B. Coordinate lane closures with the Engineer (or designee) at least 72 hours before each closure to allow for Department entry into the UDOT Traffic Lane Closure system via the UDOT Traffic website

C. Provide real-time confirmation of every lane closure on the state routes listed in Table 1, and subsequent lane reopening, using the UDOT Lane Closure mobile application. (Use an iOS or Android smartphone; download instructions for the mobile application will be provided by UDOT.)

1. Begin Lane Closure: Confirm lane closure details 30 to 45 minutes before placing the first traffic control device in the travel lane.
   a. Mobile application will generate a confirmation of the upcoming closure 45 minutes before the scheduled start time; the Contractor accepts the confirmation to activate the lane closure, or cancels or reschedules the lane closure as needed.
2. End Lane Closure: Confirm lane reopening 30 to 45 minutes before removing the last traffic control device in the lane.
   a. Mobile application will generate a confirmation 45 minutes before the scheduled expiration of lane closure; the Contractor accepts the confirmation to confirm the scheduled end time, or extends the closure as needed.
3. Call the TOC at (801) 887-3700 and provide information to activate, modify, or delete lane closure in the UDOT Traffic Lane Closure system in the event the mobile application is not working or is unavailable.
   a. Make this call 30 to 45 minutes before placing the first device in the travel lane, and 30 to 45 minutes before reopening the lane.

Table 1

State Routes Requiring Real Time Lane Closure Confirmation
All interstates (I-15, I-70, I-80, I-84, I-215)
US-6 (East of I-15)
SR-30 (I-15 to Logan)
SR-36 (I-80 to Tooele)
SR-67
SR-85
SR-154
SR-201
SR-224
SR-248
US-40
US-89 (Davis, Weber, Cache, Rich and Box Elder Counties)
US-91 (I-15 to Logan)
US-189
US-191 (Moab to I-70)

END OF SECTION

#	**015547###**	**Temporary Pedestrian Access Route (TPAR)**	**Lump**
	Amount Paid		**When Paid**
	25% of the bid item amount		With first estimate
	Remaining portion of bid item paid as a percentage of the contract completed		With each subsequent estimate

Standards Committee Submittal Sheet

Name of Preparer: Justin Wilstead

Title/Position of Preparer: Standards and Innovation Manager

Specification/Drawing/Item Title: Temporary Pedestrian Access Route

Specification/Drawing Number: TC 6A, TC 6B, TC 6C, TC 6D

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

Proposed TC 6 series drawings will replace the current TC 6 to expand upon/provide additional guidance to route pedestrians through or around a work zone. Updates are consistent with ADA, PROWAG and MUTCD requirements.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.

A new M&P standard item will need to be created to cover Temporary Pedestrian Access Route (TPAR).

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.

Existing acceptance and documentation still applies.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements
   N/A

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)
   N/A

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?
   N/A

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).

   Proposed updates may have an increase in pedestrian ramp reconstruction bid price due to the need to construct TPAR. This has been a requirement in the standards previously, so ped ramp reconstruction prices should currently reflect cost for TPAR.

   Enforcement of the requirement to provide a TPAR may also result in changes to work phasing in order to maintain pedestrian access.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).

   Estimate for material to construct a 100' temporary access route:

   - **Barricade with arrow sign - 2 @ $250 EA = $500**

- **Temporary ramp - 2 @ $500 EA = $1,000 (Assumed made of plywood by worker) (ADA self adhesive dome sticker is $160 if needed)**
- **Water barrier - 250' @ $8 FT = $2,000 (Cost to rent water barrier from united rental for 1 week is $7/FT.)**

Total material cost for 100’ detour = $3500. This will vary based upon field conditions on each project.

3. Life cycle cost.

It is anticipated that temporary ramps may be reused at different locations. Depending upon the type/material of the temp ramp that is constructed or procured, the life cycle will differ.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

Proposed drawings will provide guidance to construct a TPAR. It will also help construction management teams enforce the current ADA/PROWAG requirements that are in the TC series standard drawings and 01554.

H. Safety Impacts?

Proposed drawings will increase safety by providing additional guidance for routing pedestrians in the work zone during construction.

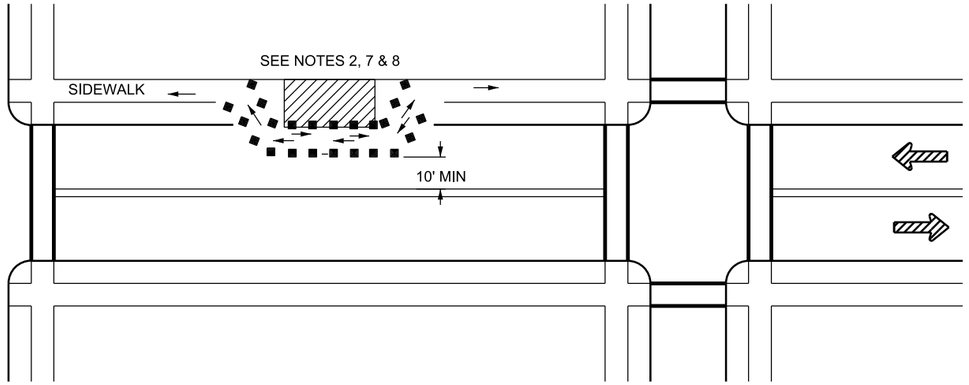
I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

Feedback from the construction crews during the FHWA stewardship work zone reviews has shown that there is a need to clarify the intent of routing pedestrians in work zones. Improvements have been made over the past few years, but it is clear that there is a need to provide additional guidance in order to provide the construction crews the tools needed to enforce what the standard drawings and specifications are currently requiring.

REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
Janice	TC Drawings	No comment		
Kirk Thornock	TC Drawings	No comments		
Daryl Friant	TC Drawings	No comments		
Michael A. Adams	TC 6 Series	No Comment		
Ryan Ferrin	TC Series	No comments		
Vincent Liu	No comments	No comments		
Branden Anderson	No comment	no comment		
Kelly Barrett	NA	No Comment		
James Corney	TC 6A	Is yellow a permitted color in the standard drawings?	Fred Doehring suggested the color to remain.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6A	Table note (i): Is there an upper limit to the running slope if the length exceeds 15 ft?	No, 15 feet is the maximum length. Slope is allowed to be increased once the 8.3% exceeds15 feet.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6A	Temporary Ramp Parallel to Curb Detail: The detail is outside the left border	Will correct.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6A	Temporary Ramp Parallel to Curb Detail: Assuming the rams are 4 feet wide, shouldn't the turning space be 5 feet wide since the detectable edge is at least 6 inches high?	The turning space shall be 4ft minimum by 5ft minimum. The 5 ft dimension shall be provided in the direction of the ramp run. PROWAG R304.2.1	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6A	Note 3: Does the contrasting color only apply to the ramp with flares?	No, Contrasting color could be installed on the ramp surface on all ramps, but is not required because the detectable edge has the contrasting color.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6A	Note 6: Separate into two notes, "Prevent or correct vertical discontinuities greater than 1/2 inch on temporary pedestrian surface." (applies to surfaces) and "A threshold can be installed when vertical discontinuity is greater than 1/2 inch between ramp and existing surface." (applies to edge treatments, update reference from edge treatment callouts)	Will separate the note.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6A	Surface Discontinuities Detail TC 6-2: Shouldn't the lateral gap be 1/2 inch max to match note 5 "Limit width of lateral joints and gaps between surfaces to 1/2 inch"	Will correct.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6B	Notes 1, 10, & 11 seem general and apply to everything. Recommend not referring to them from each detail.	Will remove callouts to notes 1, 10 and 11.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6B	Pedestrian Channelizing Barrier Detail B: Show reference to Notes 2 and 3 on the dimensions in the detail similar to other details	Will reference notes 2 and 3.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6B	Continuous Pedestrian Channelizer Detail C: Does note 8 "interlock" apply to this channelizer type?	Yes, will update note 8, change interlock to connect.	Justin Wilstead, Travis Evans, Blair Tomten
James Corney	TC 6B	Detectable Edge for Portable Sign Detail D: Please identify what the dotted vertical lines indicate. Should this be a callout to a new note "detectable edge must extend to the limits of the sign above."?	Will create new note and add callout.	Justin Wilstead, Travis Evans, Blair Tomten
FHWA	TC 6A	1) All (3) Temporary Ramp Details: Suggest adding slope arrows to ramps like PA drawings. 2) Temporary Ramp Perpendicular to Curb: Can't have two ramps with different slopes one after another without a turning space in between them. As shown, the top ramp needs to be a Turning Space (2% running slope max). 3) Note 2: Note doesn't specifically require detectable edge for temporary Turning Spaces. Suggest clarifying. 4) Note 6: Vertical discontinuities apply everywhere in TPAR, not just between ramps and existing surfaces. Suggest changing the end of the second sentence from "BETWEEN RAMP AND EXISTING SURFACE" to "ANYWHERE IN TEMPORARY WALKWAY". Suggest deleting EDGE TREATMENT & Leaders from all 3 Temporary Ramp Details and move SEE NOTE 6 under detail titles like Details TC 6-1 and TC 6-2. 5) Note 8: Could be an issue for B5 curb	1) Will add slope arrows. 2) Upper portion is not a ramp. Will remove ramp "R" label from uppor portion of temporary ramp. Add cross slope requirement. 3) Temporary ramp in the note is referring to the temporary ramp as a whole, not just the ramp portion. 4) Will update to ANYWHERE IN TEMPORARY ACCESS ROUTE. Would like to keep the edge treatment callout for emphasis. 5) We recognized this through the review process, but it is an ADA requirement that needs to be met. We do feel that this will be a limited number of cases.	Justin Wilstead, Travis Evans, Blair Tomten

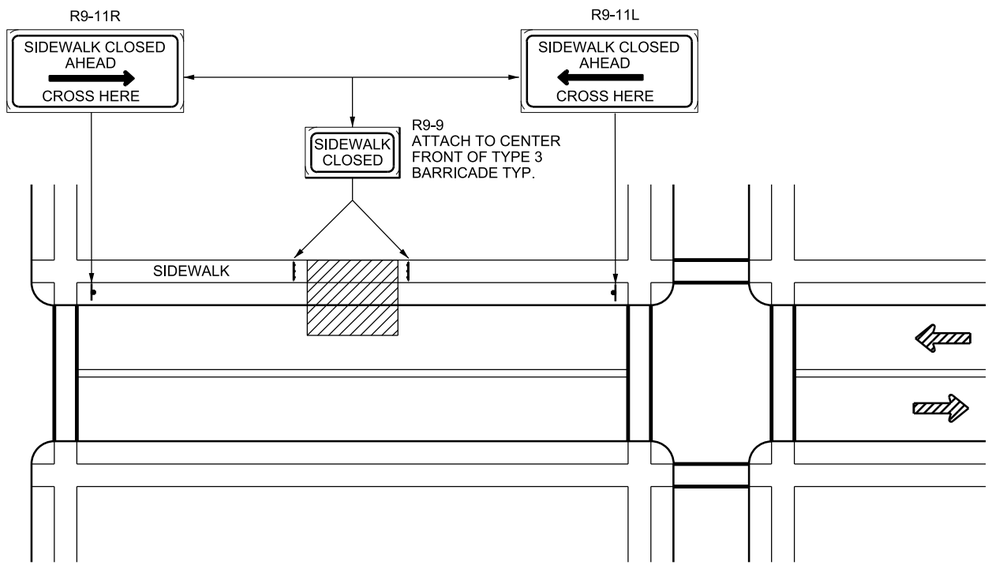
FHWA	TC 6B	1)Detail A: Does this meet the requirements of a Type II Barricade (Rail heights, stripe widths, area allowed to be covered by signs, etc)? It needs to be. Type II Barricade requirement could be added to Note 9. 2)Detail B: Recommend not calling this a barrier, which implies that it has been crash tested. Suggest TYPE 1, TYPE 2 or EXAMPLE 1 and EXAMPLE 2 LONGITUDINAL CHANNELIZING DEVICE. 3)Note 5A: As written, the acceptable materials might be construed that each by themselves meet the free-draining and non-slip requirement but most lumber and steel aren't non-slip when wet. Suggest adding to the note, to clarify. 4)Note 7: What is the criteria to determine that a Detectable Edge is not need? As written I afraid that there will be wide spread no-use of detectable edge justified by this note.	1) PROWAG does not require this to be a type II barricade, so it is not specified as a type II barricade. We have illustrated the minimum requirements. 2) Will change to Longitudinal Channelizing Device to be consistent with MUTCD. 3) The general portion of Note 5 states that it has to be non-slip and free draining. We feel there is not a need for clarification. 4) Will remove note.	Justin Wilstead, Travis Evans, Blair Tomten
FHWA	TC 6C	1)SIDEWALK DIVERSION WITHIN SHOULDER ON ROADWAY Detail: Suggest deleting "SHOULDER ON" from title. 2)SIDEWALK DIVERSION Detail: Suggest adding "OUT OF ROADWAY" to title and Note 14 references. 3)Note 13: What blunt ends?	1) Will remove SHOULDER ON in the title. 2) Accept 3) Blunt ends of a channelizing device.	Justin Wilstead, Travis Evans, Blair Tomten
FHWA	TC 6D	1)SIDEWALK DETOUR - CROSSWALK CLOSURE WITH OPTIONAL MID BLOCK CROSSING Detail and Notes 8 and 10: The use of Stop line at mid-block crosswalk as shown does not conform to UMUTCD (see UMUTCD and associated SL Drawings. Utah's AG office has said that Utah is a "Yield" state, Yield Line should be used instead of Stop Line. The 20 to 50 feet offset Yield or Stop Lines shall only be used on multi-Lane roadways. If offset Yield or Stop Lines are used, then R1-5 series sign shall be used. For the signing and stripping for the mid-block crosswalk, I would suggest referring to STD DWG SL 6F with not requiring the signal pole, overhead signing, beacons and push buttons	Stop lines have been updated to be yield lines and shown at the distance for a single lane approach, notes have been updated to reflect this change and to provide information on spacing and signs for an uncontrolled multi-lane approach.	Justin Wilstead, Travis Evans, Blair Tomten
ACEC	TC 6D	Supplemental Drawing TC 6D, Note 14 - Is it the contractor's responsibility to research and determine if a school routing plan is affected by the TPAR	Yes. It should be obvious from the SS/SP plans if a school route will be impacted by the presense of school crosswalk and sign array in the plans. It is possible that the construction takes place outside of the school year and that the school route may not be affected, but this should be cordinated with the engineer.	Justin Wilstead, Travis Evans, Blair Tomten
AGC	All	Submittal: Costs - added costs where noted for Ped Ramp Reconstruction - these revised drawings will impact far more areas of construction than just that. There will be added costs for all urban reconstruction on streets. TC 6B - Has the channelizer in detail C been crash tested? TC 6D - Would recommend requiring type B light on W11-2 sign located at the temp cross walk. General: Priority states that peds should be rerouted on same side before routing to other side of the road. To me this is a safety issue. Why do we want to put peds closer to traffic in an unprotected situation? (the barricades delineate the area - but don't provide positive protection).	TC 6B - Continuous pedestrian channelizer has not been crash tested. This device may be constructed of nominal lumber or may be purchased from a vendor and may be a different shape or style. The requirements shown allow for many different device styles. TC 6D - Will add light as optional General - It is best to keep pedestrians as close as possible to the existing route, as pedestrians are less likely to comply with TPAR if it is percieved that they can have a shorter route by walking through the work space. It is also benefital to pedestrians with visual impairments to stay close to their existing route. There also may be businesses that are still accessible along the TPAR, so moving traffic to the opposite sidewalk would not be prefered.	Justin Wilstead, Travis Evans, Blair Tomten
Charles Mason-Hill	All	No comments - previously reviewed.		
Ray Cook	TC 6B	Suggest to add "walkway" to the sheet title since the walkway is not a device. Notes 2 and 4B: Change "inches" to "inch." Note 5B: Change "or" to "and." Note 6: Change "inches" to "Inch." Reword to ". . . must have a height of at least 32 inch." Note 9: Add "of the" before "width." Note 12: Match wording of TC 6A, Note 5.	Accept all changes.	Justin Wilstead, Travis Evans, Blair Tomten

Ray Cook	TC 6C	Note 3: Change “prior to” to “before” consistent with spec writers guide. Note 5: Delete “wide” after “4 ft.” Note 5, 2nd sentence: Items in series don’t match. Either change “encroach” to “encroachment” or reword to “Shift lanes, close lanes, or encroach into . . .” Note 14: Correct spelling of “accommodate.”	Accept all changes.	Justin Wilstead, Travis Evans, Blair Tomten
Ray Cook	TC 6D	Note 4: Change “prior to” to “before” consistent with spec writers guide. Note 6: The requirement for Engineer’s approval suggests that this is a separate request and action from including the crosswalk location in the traffic control plan which is submitted for review and results in authorization for use (not approval). If this is not the intent, the first sentence should be deleted.	Accept all changes.	Justin Wilstead, Travis Evans, Blair Tomten



TEMPORARY WALKWAY

(DETAIL TC 6-1) SEE NOTE 1



ALTERNATE ROUTE

(DETAIL TC 6-2) SEE NOTES 1 & 12

NOTES:

1. ONLY THE TRAFFIC CONTROL DEVICES CONTROLLING PEDESTRIAN FLOWS ARE SHOWN. OTHER DEVICES ARE REQUIRED TO CONTROL TRAFFIC ON THE STREET. USE LANE CLOSURE SIGNING OR ROAD NARROWS SIGNS, AS NEEDED.
2. PROVIDE A TEMPORARY WALKWAY A MINIMUM OF 48 INCHES WIDE AROUND THE WORK SPACE IF WALKWAY IS CLOSED TO PEDESTRIANS. MAINTAIN A MINIMUM TRAVELED WAY WIDTH OF 10 FT. PROVIDE LANE SHIFTS, LANE CLOSURES, OR ENCROACH INTO OPPOSITE DIRECTION OF TRAFFIC ACCORDING TO STD DWG TC 8 IF THE MINIMUM CAN NOT BE ACHIEVED.
3. DIRECT PEDESTRIANS TO ALTERNATE ROUTES IF WALKWAY CANNOT BE PROVIDED. (SEE DETAIL TC 6-2)
4. COVER THE TEMPORARY WALKWAY WHEN POTENTIAL OF FALLING MATERIAL EXISTS.
5. CONSTRUCT TEMPORARY WALKWAY WITH A WOOD FLOOR OR PAVED SURFACE SO THAT IT IS TRAVERSABLE BY A WHEELCHAIR.
6. COMPLETE WORK ON ONE SIDE AND REOPEN PRIOR TO STARTING WORK ON THE OTHER SIDE WHEN SIDEWALKS EXIST ON BOTH SIDES OF STREET.
7. MOUNT SIGNS ON BARRICADE OR 7 FT MINIMUM HEIGHT ABOVE SIDEWALK.
8. MAINTAIN AN ACCESSIBLE AND DETECTABLE PEDESTRIAN FACILITY ALONG THE ALTERNATE PEDESTRIAN ROUTE WHEN THE TEMPORARY TRAFFIC CONTROL ZONE AFFECTS EXISTING ACCESSIBLE AND DETECTABLE PEDESTRIAN FACILITIES. USE A CONTINUOUS DETECTABLE BOTTOM AND TOP SURFACE DETECTABLE BY LONG CANE USERS WHEN CHANNELIZATION DEVICES ARE USED TO CHANNELIZE PEDESTRIANS. THE BOTTOM OF THE BOTTOM SURFACE WILL BE NO HIGHER THAN 2 INCHES ABOVE THE GROUND. THE TOP OF THE TOP SURFACE WILL BE NO LOWER THAN 32 INCHES ABOVE THE GROUND.
9. USE A MINIMUM 20 FT CORNER RADIUS TO DEVELOP A TEMPORARY WALKWAY AROUND A CORNER.
10. DIRECT PEDESTRIANS TO AN INTERSECTION OR MARKED CROSSWALK AS AN ALTERNATE ROUTE WHEN POSSIBLE.
11. CONSULT THE ENGINEER WHEN SCHOOL ROUTING PLANS ARE AFFECTED.
12. DO NOT DIRECT PEDESTRIANS TO OPPOSITE SIDE OF STREET IF THE SIDEWALK DOES NOT EXIST ON THE OPPOSITE SIDE OF THE STREET.
13. PROVIDE A 5 x 5 FT PASSING AREA EVERY 200 FT OF TEMPORARY SIDEWALK.
14. SEE GW 5 SERIES STD DWGS FOR PEDESTRIAN ACCESS REQUIREMENTS.
15. SEE STD DWG TC 4A FOR TRAFFIC CONTROL DEVICE LEGEND.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	JAN. 01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	JAN. 01, 2017 DATE
DEPUTY DIRECTOR	DATE

TEMPORARY PEDESTRIAN ACCESS ROUTE

STANDARD DRAWING TITLE

STD. DWG. NO.

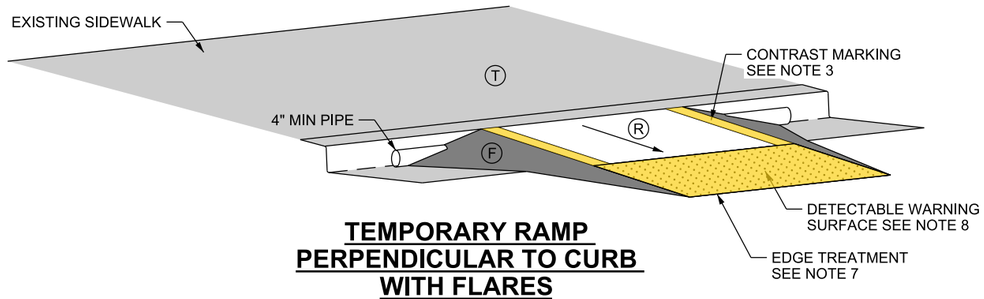
TC 6

DIMENSION REFERENCE TABLE				
	ITEM	MAX. RUNNING SLOPE	MAX. CROSS SLOPE	MIN. DIMENSIONS
Ⓣ	TURNING SPACE	2.0%	2.0% (ii)	5 FT X 5 FT (iii)
Ⓡ	RAMP	8.3% (i)	2.0% (ii)	4 FT WIDE
Ⓕ	FLARE	-	25.0%	-

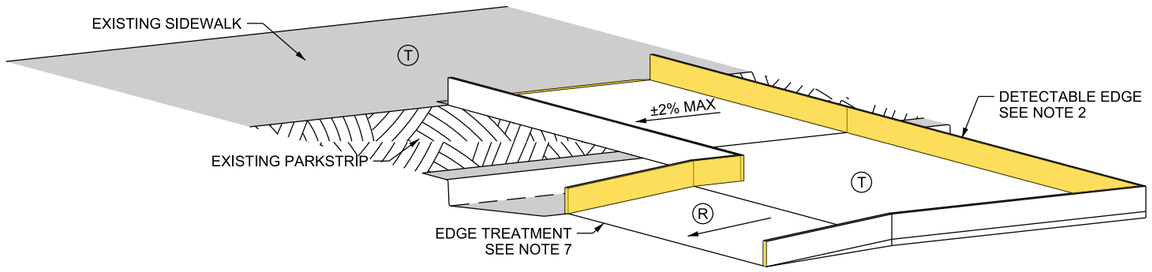
(i) MAX RUNNING SLOPE IS ALLOWED TO EXCEED 8.3% WHEN RAMP LENGTH EXCEEDS 15 FT.

(ii) MID BLOCK CROSSINGS CAN MATCH THE STREET GRADE.

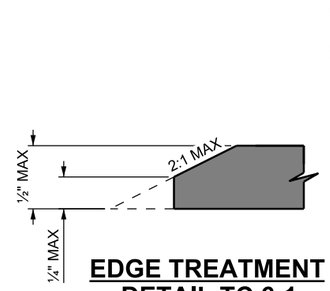
(iii) A 4 FT X 4 FT TURNING SPACE IS ALLOWED WHERE IT IS NOT CONSTRAINED BY ANY VERTICAL EDGE GREATER THAN 3 INCH.



TEMPORARY RAMP PERPENDICULAR TO CURB WITH FLARES

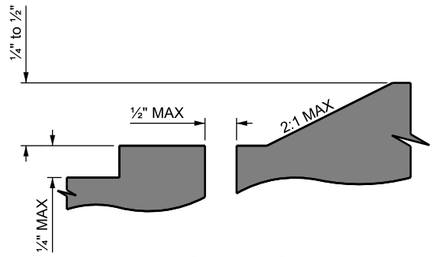


TEMPORARY RAMP PARALLEL TO CURB



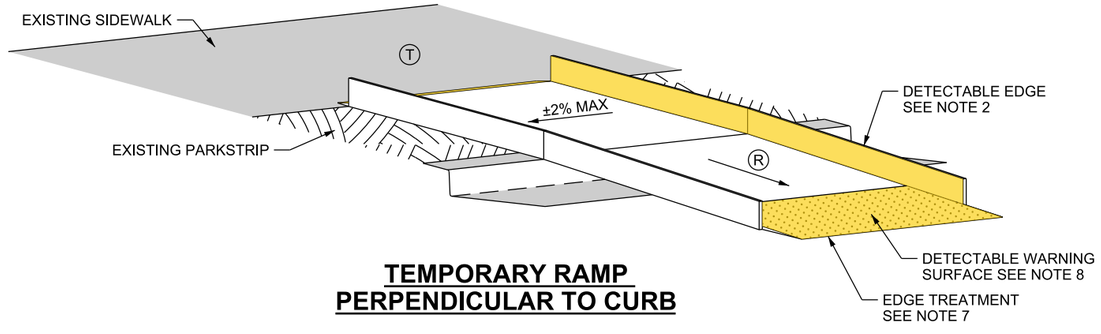
EDGE TREATMENT DETAIL TC 6-1

SEE NOTE 7



SURFACE DISCONTINUITIES DETAIL TC 6-2

SEE NOTE 6



TEMPORARY RAMP PERPENDICULAR TO CURB

GENERAL NOTES:

1. CONSTRUCT CURB RAMPS AND TEMPORARY WALKWAYS OF A FIRM, STABLE, AND SLIP RESISTANT SURFACE THAT IS CAPABLE OF SUPPORTING THE WEIGHT OF MOBILITY DEVICES AND PEDESTRIANS IN WHEELCHAIRS WITHOUT BUCKLING OR WARPING.
2. INSTALL DETECTABLE EDGE WITH 6 INCH MINIMUM HEIGHT ON TEMPORARY RAMPS THAT DO NOT HAVE FLARES.
3. MARK THE TEMPORARY RAMP WALKWAY EDGE WITH A CONTRASTING COLOR, 4 INCH WIDE MARKING TO BE INCLUDED IN THE WIDTH OF THE RAMP. THE MARKING IS OPTIONAL WHERE COLOR CONTRASTING DETECTABLE EDGE IS USED.
4. DO NOT BLOCK THE FLOW OF WATER IN THE GUTTER SYSTEM.
5. LIMIT WIDTH OF LATERAL JOINTS AND GAPS BETWEEN SURFACES TO ½ INCH.
6. PREVENT OR CORRECT VERTICAL DISCONTINUITIES GREATER THAN ½ INCH ON TEMPORARY PEDESTRIAN SURFACE. SEE DETAIL TC 6-1.
7. A THRESHOLD CAN BE INSTALLED WHEN VERTICAL DISCONTINUITY IS GREATER THAN ½ INCH ANYWHERE IN TEMPORARY ACCESS ROUTE. SEE DETAIL TC 6-2.
8. PROVIDE DETECTABLE WARNING SURFACE WHEN TEMPORARY RAMP CONNECTS TO A CROSSWALK. SEE STD DWG PA 2 FOR DETECTABLE WARNING SURFACE REQUIREMENTS.
9. INSTALL HANDRAILS ON BOTH SIDES OF THE TEMPORARY RAMP WHEN RAMP SURFACE IS GREATER THAN 6 INCH ABOVE SURROUNDING SURFACE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

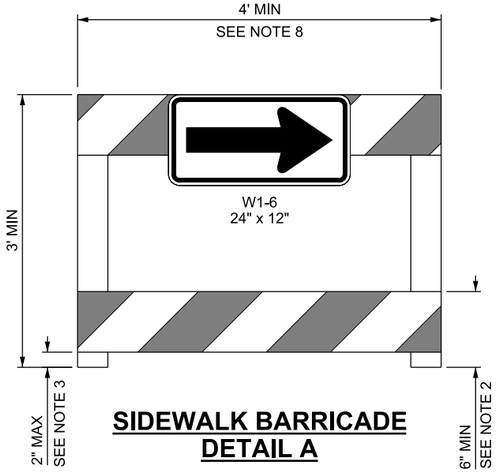
RECOMMENDED FOR APPROVAL	AUG. 29, 2019	DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG. 29, 2019	DATE
DEPUTY DIRECTOR		

TEMPORARY PEDESTRIAN ACCESS ROUTE - RAMP DETAILS

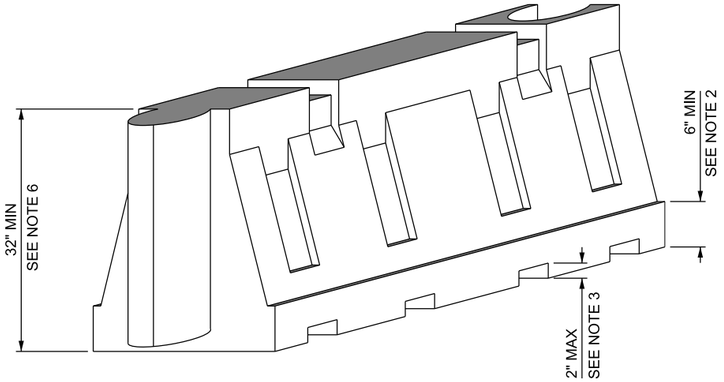
STANDARD DRAWING TITLE

STD. DWG. NO.

TC 6A

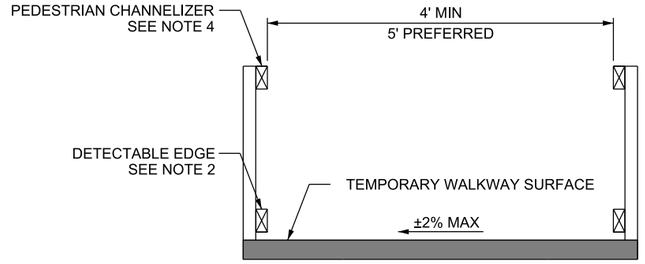


SIDEWALK BARRICADE DETAIL A



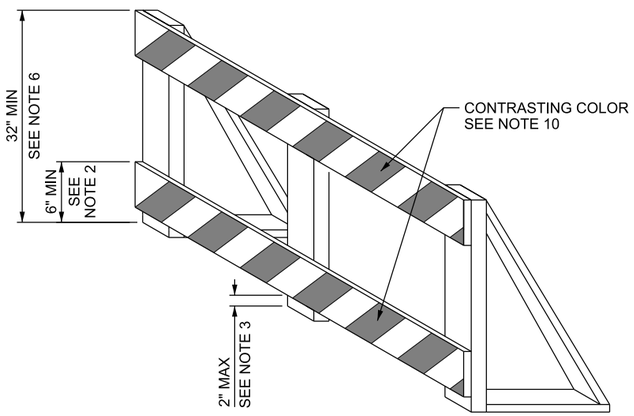
PEDESTRIAN LONGITUDINAL CHANNELIZING DEVICE DETAIL B

SEE NOTES 2, 3, 8



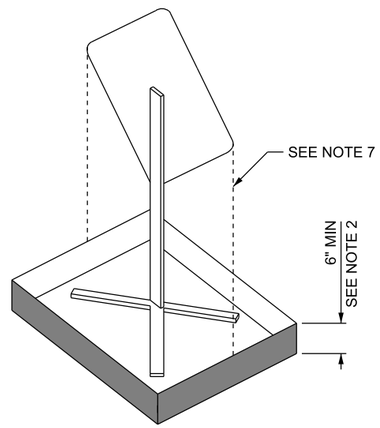
TEMPORARY WALKWAY SECTION DETAIL F

SEE NOTE 5



CONTINUOUS PEDESTRIAN CHANNELIZER DETAIL C

SEE NOTES 4, 8



DETECTABLE EDGE FOR PORTABLE SIGN DETAIL D

NOTES:

1. ALL TRIPPING HAZARDS IN THE WALKWAY NEED A DETECTABLE EDGE. LOCATE BALLAST BEHIND OR INTERNAL TO THE DEVICE. LOCATE DEVICE SUPPORT LEGS BEHIND THE DETECTABLE EDGE.
2. DETECTABLE EDGES USED AROUND PORTABLE SIGNS, BARRICADE, AND PEDESTRIAN CHANNELIZER MUST BE CONTINUOUS, HAVE A HEIGHT ABOVE WALKWAY SURFACE OF AT LEAST 6 INCH, AND HAVE COLOR MARKINGS CONTRASTING WITH THE WALKWAY SURFACE.
3. MAINTAIN DRAINAGE OFF THE WALKWAY. A MAXIMUM GAP HEIGHT OR WIDTH FROM THE WALKWAY SURFACE OF 2 INCHES IS ALLOWED FOR DRAINAGE PURPOSES.
4. THE HANDRAIL SURFACE MUST MEET THE FOLLOWING WHEN HAND GUIDANCE IS REQUIRED:
   A. BE IN A VERTICAL PLANE PERPENDICULAR TO THE WALKWAY ABOVE THE DETECTABLE EDGE,
   B. BE CONTINUOUS AT A HEIGHT OF 34 TO 38 INCH ABOVE THE WALKWAY SURFACE,
   C. BE SUPPORTED WITH MINIMAL INTERFERENCE TO THE PEDESTRIAN'S HANDS, AND
   D. BE SMOOTH AND FREE OF SHARP/ROUGH EDGES TO PREVENT HARM TO HANDS, ARMS OR CLOTHING OF PEDESTRIANS.
5. PROVIDE A FIRM, STABLE, FREE-DRAINING AND NON-SLIP TEMPORARY WALKWAY SURFACE THAT ALLOWS NORMAL USAGE OF WHEELCHAIRS, WALKERS, STROLLERS, AND OTHER MOBILITY DEVICES.
   A. CONCRETE, HMA, STEEL, RUBBER, WOOD (¼ INCH OR THICKER), AND PLASTIC ARE ACCEPTABLE SURFACE MATERIALS.
   B. GRAVEL, UNTREATED BASE COURSE, AND OTHER UNEVEN SURFACES ARE NOT ACCEPTABLE SURFACE MATERIALS.
6. LONGITUDINAL CHANNELIZING DEVICES FOR PEDESTRIANS MUST HAVE A HEIGHT OF AT LEAST 32 INCH.
7. DETECTABLE EDGE MUST EXTEND TO THE LIMITS OF THE SIGN ABOVE.
8. CONNECT DEVICES USED TO CHANNELIZE PEDESTRIANS SUCH THAT GAPS DO NOT ALLOW PEDESTRIANS TO STRAY FROM THE CHANNELIZED PATH.
9. PLACE SIDEWALK BARRICADE ACROSS AT LEAST TWO-THIRDS OF THE WIDTH OF THE CLOSED WALKWAY SURFACE.
10. APPLY CONTRASTING COLOR TO PEDESTRIAN CHANNELIZING DEVICES WHEN USED TO CHANGE DIRECTION OF DETECTABLE ROUTE. CONTRASTING COLOR IS OPTIONAL WHEN USED PARALLEL TO DETECTABLE ROUTE.
11. CONTRASTING COLORS INCLUDE YELLOW, ORANGE, AND ORANGE/WHITE RETROREFLECTIVE STRIPES.
12. PREVENT OR CORRECT VERTICAL DISCONTINUITIES GREATER THAN ½ INCH ON TEMPORARY PEDESTRIAN SURFACE.

SUPPLEMENTAL DRAWING

REVISIONS

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UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

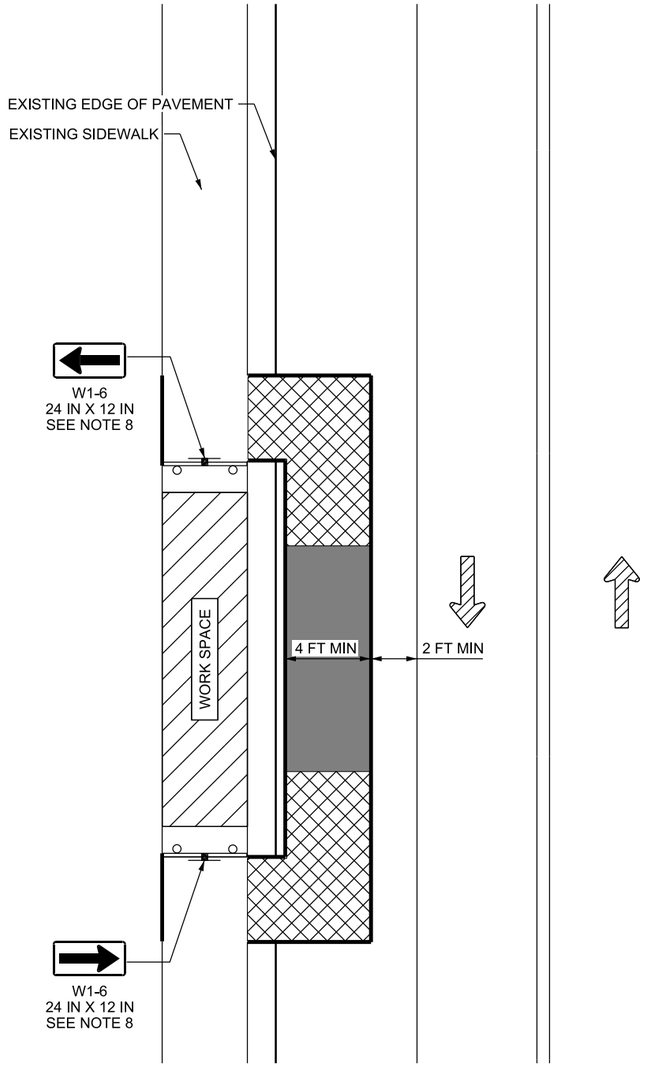
TEMPORARY PEDESTRIAN ACCESS ROUTE - WALKWAY AND DEVICE DETAILS

STANDARD DRAWING TITLE

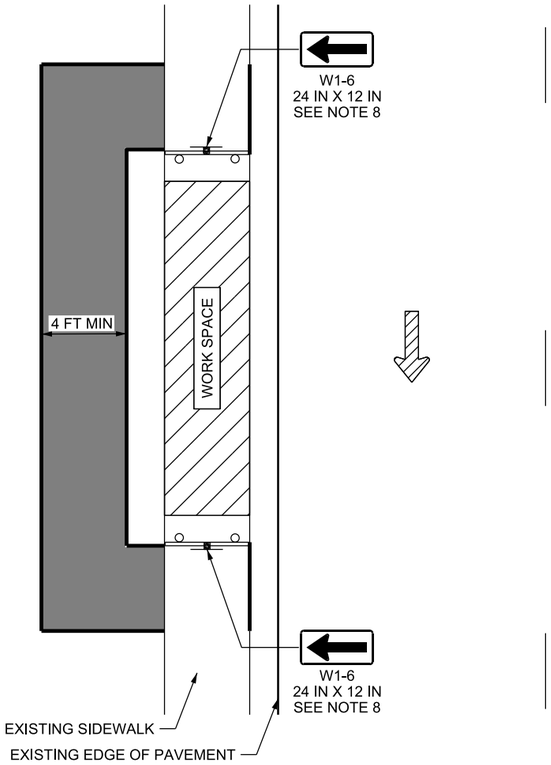
STD. DWG. NO.

TC 6B

SIDEWALK DIVERSION WITHIN ROADWAY



SIDEWALK DIVERSION OUT OF ROADWAY



TEMPORARY PEDESTRIAN ACCESS ROUTE DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- PEDESTRIAN CHANNELIZATION DEVICE
- DIRECTION OF TRAFFIC
- SIDEWALK BARRICADE
- RAMP (SEE STD DWG TC 6A)
- TEMPORARY WALKWAY

NOTES:

1. PHASE WORK AS NECESSARY TO PROVIDE A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) AT ALL TIMES.
2. ONLY THE TPAR DEVICES ARE SHOWN. USE WORK SPACE SIGNING OR SHOULDER WORK SPACE SIGNING AS NEEDED.
3. MAINTAIN A TPAR THAT IS CONSISTENT WITH THE LEVEL OF ACCESSIBILITY PRESENT BEFORE CONSTRUCTION.
4. USE CONTINUOUS DETECTABLE EDGE ON ALL PEDESTRIAN CHANNELIZATION DEVICES.
5. PROVIDE A TEMPORARY WALKWAY, CONSTRUCTED OF A FIRM, STABLE, AND SLIP RESISTANT SURFACE, WITH A MINIMUM WIDTH OF 4 FT WIDE AROUND THE WORK SPACE IF SIDEWALK IS CLOSED TO PEDESTRIANS. SHIFT LANES, CLOSE LANES, OR ENCROACH INTO OPPOSITE DIRECTION OF TRAFFIC ACCORDING TO STD DWG TC 8. REDUCE THE TRAVEL LANE ACCORDING TO TC 1 NOTE 10.
6. PROVIDE A 5 FT X 5 FT PASSING SPACE EVERY 200 FT WHEN TEMPORARY WALKWAY IS LESS THAN 5 FT WIDE.
7. COVER THE TEMPORARY WALKWAY WHEN THE POTENTIAL FOR FALLING MATERIAL EXISTS.
8. MOUNT SIGNS ON FRONT OF SIDEWALK BARRICADE, PEDESTRIAN CHANNELIZER, OR ACCORDING TO STD DWG SN 2A.
9. PLACE TEMPORARY TRAFFIC CONTROL DEVICES SUCH THAT LINE OF SIGHT BETWEEN VEHICLE TRAFFIC AND PEDESTRIAN TRAFFIC IS NOT HINDERED.
10. SEE STD DWG TC 6A FOR TEMPORARY RAMP DETAILS.
11. SEE STD DWG TC 6B FOR PEDESTRIAN CHANELIZATION DEVICE DETAILS.
12. USE AN OUTSIDE CORNER RADIUS OF AT LEAST 20 FT TO DEVELOP A TEMPORARY WALKWAY AROUND A CORNER ON THE ROADWAY.
13. PROTECT BLUNT ENDS WITHIN THE MAXIMUM CLEAR ZONE OF BOTH APPROACH AND TRAILING ENDS.
14. USE A SIDEWALK DIVERSION OUT OF ROADWAY WHEN RIGHT-OF-WAY IS AVAILABLE BEHIND THE BACK OF SIDEWALK. A SIDEWALK DIVERSION MAY ALSO BE PLACED IN THE PARK STRIP WHEN IT IS WIDE ENOUGH TO ACCOMMODATE THE TEMPORARY WALKWAY.

SUPPLEMENTAL DRAWING

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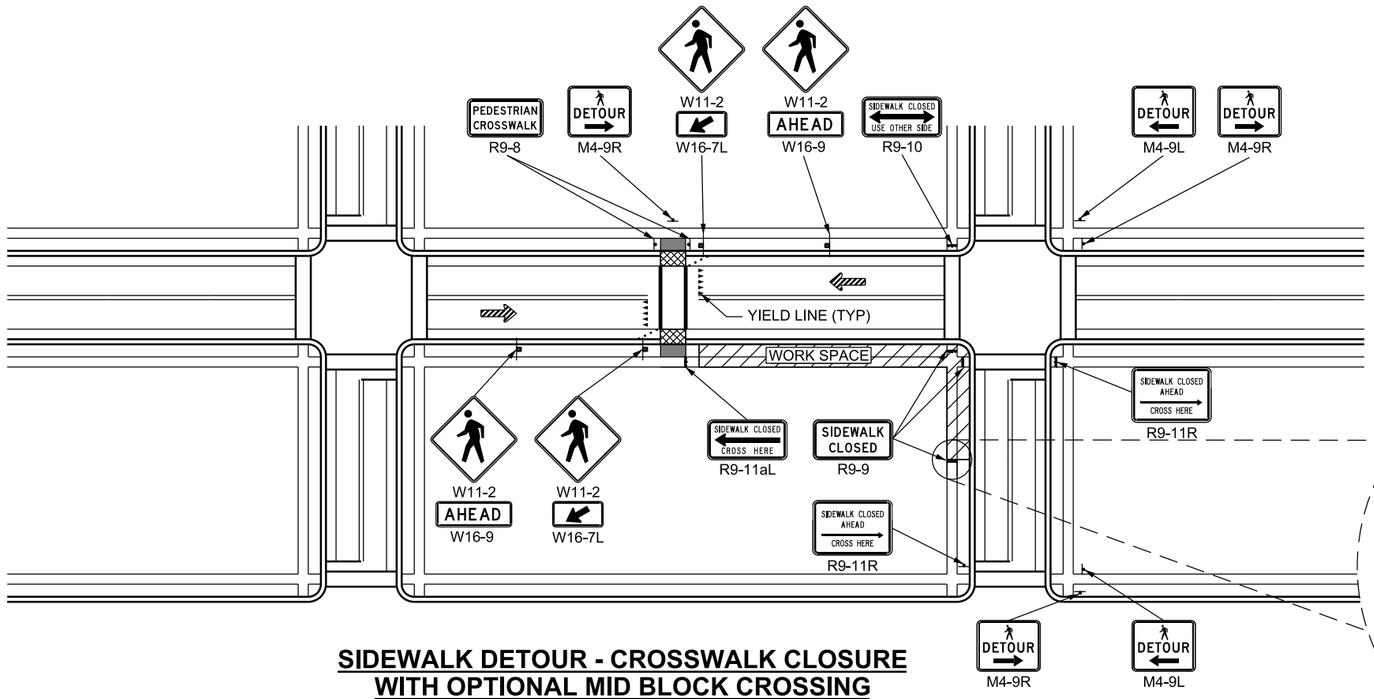
TEMPORARY PEDESTRIAN ACCESS ROUTE - DIVERSION

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 6C

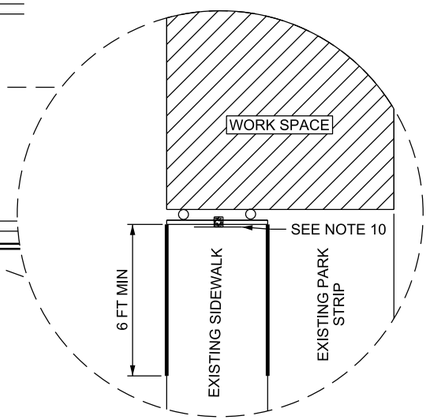


SIDEWALK DETOUR - CROSSWALK CLOSURE WITH OPTIONAL MID BLOCK CROSSING

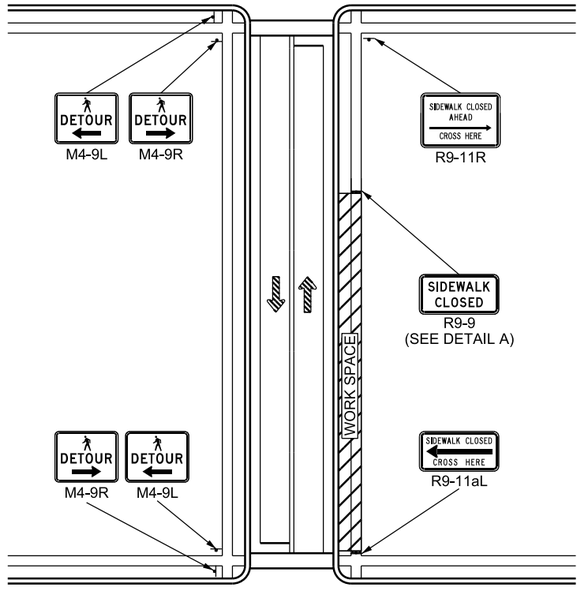
SEE NOTE 6

TEMPORARY PEDESTRIAN ACCESS ROUTE DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- PEDESTRIAN CHANNELIZATION DEVICE
- DIRECTION OF TRAFFIC
- SIDEWALK BARRICADE
- TEMPORARY RAMP (SEE STD DWG TC 6A)
- TEMPORARY WALKWAY
- CHANNELIZING DEVICES



DETAIL A



SIDEWALK DETOUR - MID BLOCK CLOSURE

NOTES:

1. PHASE WORK AS NECESSARY TO PROVIDE A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) AT ALL TIMES.
2. MINIMIZE DISRUPTION TO PEDESTRIANS TO THE MAXIMUM EXTENT FEASIBLE BY PROVIDING A TPAR IN THE FOLLOWING ORDER OF PREFERENCE:
   A. PROVIDE THE TPAR ON THE SAME SIDE OF THE ROADWAY AS THE DISRUPTED ROUTE UTILIZING SIDEWALK DIVERSION.
   B. PROVIDE A DETOUR ON THE OTHER SIDE OF THE ROADWAY WHERE IT IS NOT FEASIBLE TO PROVIDE A SAME SIDE TPAR
   C. PROVIDE A TPAR DETOUR WITH TRAILBLAZING SIGNS WHERE IT IS NOT FEASIBLE TO PROVIDE A TPAR ON THE OTHER SIDE OF THE ROADWAY
3. ONLY THE TPAR DEVICES ARE SHOWN. USE WORK SPACE SIGNING OR SHOULDER WORK SPACE SIGNING AS NEEDED.
4. MAINTAIN A DETECTABLE PEDESTRIAN FACILITY ALONG THE TPAR WHEN THE WORK SPACE AFFECTS EXISTING PEDESTRIAN FACILITIES. TPAR MUST PROVIDE THE LEVEL OF ACCESSIBILITY PRESENT BEFORE CONSTRUCTION.
5. USE CONTINUOUS DETECTABLE EDGE ON ALL PEDESTRIAN CHANNELIZATION DEVICES.
6. TEMPORARY MID BLOCK CROSSING MAY BE USED IF IT IS MORE THAN 600 FEET FROM SIGNALIZED CROSSING, WILL BE IN PLACE FOR LONGER THAN 14 DAYS, AND THE ROADWAY SPEED LIMIT DOES NOT EXCEED 40 MPH. OMIT R9-9 AND W11-2 SIGN ASSEMBLIES IF TEMPORARY PEDESTRIAN CROSSWALK IS NOT PROVIDED.
7. LOCATE TEMPORARY YIELD LINES 20 TO 50 FT IN ADVANCE OF THE TEMPORARY CROSSWALK ON UNCONTROLLED MULTI-LANE APPROACHES AND AT 5 FT FOR SINGLE LANE APPROACH. PROHIBIT STREET PARKING FOR AT LEAST 50 FT IN ADVANCE OF THE TEMPORARY CROSSWALK. R1-5 SERIES SIGNS SHOULD BE USED ON UNCONTROLLED MULTI-LANE APPROACH.
8. USE TEMPORARY PAVEMENT MARKING FOR TEMPORARY CROSSWALK LINES AND YIELD LINES.
9. COVER OR DEACTIVATE PEDESTRIAN TRAFFIC SIGNAL DISPLAY CONTROLLING CLOSED CROSSWALK.
10. MOUNT SIGNS ON FRONT OF SIDEWALK BARRICADE, PEDESTRIAN CHANNELIZER, OR ACCORDING TO STD DWG SN 2A.
11. PLACE TEMPORARY TRAFFIC CONTROL DEVICES SUCH THAT LINE OF SIGHT BETWEEN VEHICLE TRAFFIC AND PEDESTRIAN TRAFFIC IS NOT OBSTRUCTED.
12. SEE STD DWG TC 6A FOR TEMPORARY RAMP DETAILS.
13. SEE STD DWG TC 6B FOR PEDESTRIAN CHANNELIZATION DEVICE DETAILS.
14. CONSULT THE ENGINEER WHEN SCHOOL ROUTING PLANS ARE AFFECTED.
15. PLACE CHANNELIZATION DEVICES ON A TAPER UPSTREAM OF TEMPORARY RAMPS THAT EXTEND INTO THE SHOULDER TO DIRECT VEHICLES AND BICYCLISTS AWAY FROM THE TEMPORARY RAMP.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	AUG. 29, 2019	DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG. 29, 2019	DATE
DEPUTY DIRECTOR		

TEMPORARY PEDESTRIAN ACCESS ROUTE - DETOUR

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 6D

Standards Committee Submittal Sheet

Name of Preparer: Shawn Debenham

Title/Position of Preparer: Roadside Safety Manager

Specification/Drawing/Item Title: BA 1,2 & 3 Series (Concrete Barrier)

Specification/Drawing Number:

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

The following drawings have designer only notes moved out into the RDM Concrete Barrier drawings: BA 1D, BA 1E, and BA 3A2

The following drawings have designer Only notes modified for construction notes to ensure information is not missed in the field.

BA 1A1	**BA 3A4**	**BA 3G**
BA 2A	**BA 3B**	**BA 3H**
BA 2B	**BA 3C1**	**BA 3I1**
BA 2D	**BA 3E1**	**BA 3J**
BA 2E	**BA 3E3**	**BA 3K1**
BA 3A1	**BA 3F1**	**BA 3K2**
BA 3A2	**BA 3F2**	

BA 3K3	**BA 3M4**	**BA 3P2**
BA 3K5	**BA 3O1**	**BA 3Q1**
BA 3L	**BA 3O2**	**BA 3Q2**
BA 3M1	**BA 3O4**	
BA 3M2	**BA 3P1**	

The following Concrete Barrier Median Small Sign drawings have been deleted due to non-MASH compliant sign base design. SN-14 MASH approved sign base design will be used for mounting small signs on top of median barrier: BA 2C, BA 3D, & BA 3N Series

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
No Change: Construction requirements have not changed due to note changes.

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
No Change: Construction requirements have not changed due to note changes.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to “Standards Committee Members” for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph “C” above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements

   No Change

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)

   No Change

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section’s publishing process.**

4. What additional systems and documents need modification to reflect this change?

   No Change

F. Costs? (Estimates are acceptable.)

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).

No Change: Construction requirements have not changed due to note changes.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).

No Change: Construction requirements have not changed due to note changes.

3. Life cycle cost.

No Change: Construction requirements have not changed due to note changes.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

Note changes clarify requirements needed for both the project design and construction phases.

H. Safety Impacts?

No Change

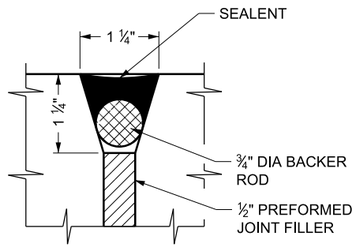
I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

See Part A

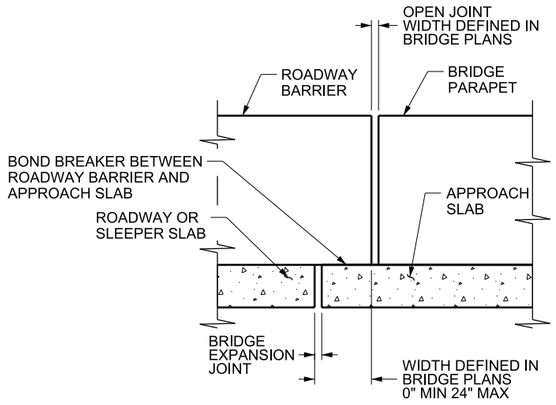
Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
7/18/2019 14:35:38	jtremaine@utah.gov	Janice	BA Drawings	No comment		
7/18/2019 14:47:15	kthornock@utah.gov	Kirk Thornock	BA Drawings	No comments		
7/19/2019 11:14:39	shawnlambert@utah.gov	Shawn Lambert	BA Drawings	No Comments		
7/19/2019 13:31:41	dfriant@utah.gov	Daryl Friant	BA Drawings	No Comments		
7/19/2019 17:51:16	michaeladams@utah.gov	Michael A. Adams	BA Series	No Comment		
7/22/2019 15:56:48	Rferrin@utah.gov	Ryan Ferrin	BA Series	No comments		
7/25/2019 13:03:13	mcrasmussen@utah.gov	Marge Rasmussen	BA01E	See notes B-E?	Moved note call out to DM Layer.	Shawn D.
7/25/2019 13:21:35	mcrasmussen@utah.gov	Marge Rasmussen	BA 3K5	Have two #2's	Modified notes accordingly	Shawn D.
7/25/2019 15:16:01	vliu@utah.gov	Vincent Liu	BA 1E	Consider to use titles of drawings as: " ELEVATION - DESIGN SPEED ≤ 40 MPH" and "ELEVATION - DESIGN SPEED > 40 MPH"	Incorporated within the drawing	Shawn D.
7/29/2019 14:31:19	dpage@utah.gov	Danny Page	BA Series	No comments		
7/29/2019 15:37:02	jcorney@utah.gov	James Corney	Various	BA 2B: Note 3, BA 3A4: Note 3, BA 3E3: Note 8, BA 3G: Note 3, BA 3H: Note 3, BA 3I1: Note 3, BA 3J: Note 4, BA 3K2: Note 3, BA 3M4: Note 3, & BA 3O4: Note 4 - Delete, redundant with "Provide scuppers as shown" and it's a given that the plans will indicate when to use a standard. (2A deleted this note)	Incorporated within the drawing	Shawn D.
7/29/2019 15:37:20	jcorney@utah.gov	James Corney	BA 3B	Update did not use the existing supplemental as a baseline. This is revision 2.	Changed to current file.	Shawn D.
7/29/2019 15:37:39	jcorney@utah.gov	James Corney	BA 3E3	Note 10 is not fitting in border.	Incorporated within the drawing	Shawn D.
7/29/2019 15:37:57	jcorney@utah.gov	James Corney	BA 3K3: Note 5, & BA 3M2: Note 3	Delete Note. This looks like a designer note, a similar note was deleted from BA 3A2, & BA 3A1	Moved notes to DM layer.	Shawn D.
7/29/2019 15:38:13	jcorney@utah.gov	James Corney	BA 3K5	Renumber notes, number 2 used twice	Notes modified.	Shawn D.
7/30/2019 11:57:32	kbarrett@utah.gov	Kelly Barrett	NA	No comment		
7/30/2019 14:54:51	fdoehring@utah.gov	Fred Doehring	all	No comments at this time		
7/31/2019 7:46:53	dlahusen@avenueconsultants.com	ACEC	BA 1D	Consider moving notes 1, 2 and 3 to design notes as the contractor should be installing these items based on the requirements provided through the project contract documents and not the Standard Drawings.	Since 2012 and changes in notes from 2017 it has become apparent that field personnel need this information to ensure the systems are installed correctly. Historically I have found plans with missing barrier elements or call out for the incorrect location of barrier ofset from curb and gutter or call out for sloped end sections for high speed roadways when they should not be. Also the contrator selects the specific end treatment within the advertised Type such as there are 2 Mash Type G systems, 2 Mash Type B systems etc.	Shawn D.
7/31/2019 7:52:27	dlahusen@avenueconsultants.com	ACEC	BA 1E	Consider removing "See Notes C & D Calculated Length of Need" and replacing with "As shown in project documents" or equivalent, as the contractor isn't expected to determine this length.	Moved call out to design layer.	Shawn D.

7/31/2019 8:00:44	dlahusen@avenueconsultants.com	ACEC	BA 1E	A lot of this drawing seems to only apply to a designer as these lengths, item types, and offsets should be provided as part of the project documents. Consider moving drawing to a design only drawing or simplifying to only applying to what would be relevant to a contractor.	The majority of plan sheets are not created to the level of design as this Std. Dwg. Since 2012 it has become apparent that field personnel need this information to ensure the foundation end blocks placed at the required location and the barrier offset from column is installed correctly. Further, the contractor determines the thickness of barrier pad which determines if a foundation endblock is required. Design only notes and call outs have been moved to the DM layer. Detail regarding bridge column design impact load moved to DM layer. Drawing will remain a Std. Dwg.	Shawn D.
8/1/2019 10:53:12	cmason-hill@utah.gov	Charles Mason-Hill	BA-01E	Remove references to notes that were removed from the page.	Design only callouts moved to DM layer.	Shawn D.
8/1/2019 10:56:15	cmason-hill@utah.gov	Charles Mason-Hill	BA-2B	Note 3 - change with to when.	Note 3 modified.	Shawn D.
8/5/2019 20:29:15	raycook@utah.gov	Ray Cook	BA drawings, General Comments	1. In most cases, Design notes suddenly became notes to Contractor. Make sure that the notes really are directed to the Contractor and not to designers. I don't think this is always the case. For example, the note referencing BA 1B to BA 1D for typical layouts is unnecessary. The Contractor constructs to the details to the typical sections in plans. He doesn't pick a typical layout. 2. Use consistent terms such as "reinforcing steel" instead of "reinforcement." Replace "reinforcing schedule" with "reinforcing steel schedule." Since you are referencing reinforcing steel schedule, identify it with a title. Design Plan Set is not a defined term. 3. Several notes say that the Engineer approves contractor devised method of positioning reinforcement. Means and methods are typically authorized, not approved. Is it really necessary for the Engineer to authorize this level of detail? 4. Sheets BA 2C, BA 3D, BA 3N1 & 3N2 are being deleted. Doesn't this require some renumbering or at least some notification that there is a break in the sequence?	1. Removed note from drawings. 2. Incorporated within the drawings. 3. Deleted note on drawings as directed. 4. This is an issue for Brad and George.	Shawn D.
8/5/2019 20:30:36	raycook@utah.gov	Ray Cook	BA 1E	Sections and probably entire drawing are for designers and go with design notes that were deleted. Not directed at contractors. Details are still referencing design notes.	The majority of plan sheets are not created to the level of design as this Std. Dwg. Since 2012 it has become apparent that field personnel need this information to ensure the foundation end blocks placed at the required location and the barrier offset from column is installed correctly. Further, the contractor determines the thickness of barrier pad which determines if a foundation endblock is required. Design only notes and call outs have been moved to the DM layer. Detail regarding bridge column design impact load moved to DM layer. Drawing will remain a Std. Dwg.	Shawn D.

8/5/2019 20:34:52	raycook@utah.gov	Ray Cook	BA 2B	Note 3 doesn't make sense. Reword. Note 4: BA 1D has no sloped end details. (Same comment applies to multiple drawings that use the same note.)	Note 3 modified. Note 4: BA 1D requires a sloped end for the buried end section installation.	Shawn D.

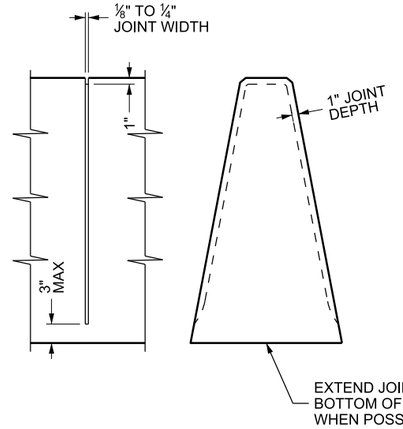


TYPE 1



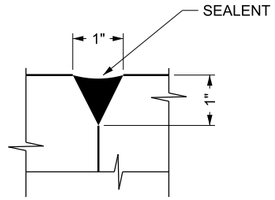
TYPE 2

EXPANSION JOINT DETAILS

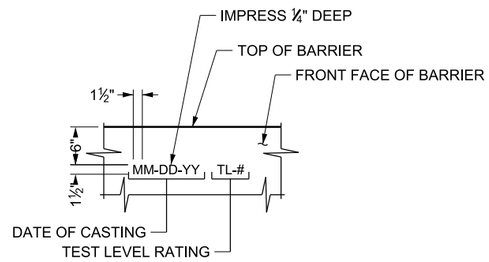


ELEVATION **END VIEW**

SAW CUT CONTRACTION JOINT

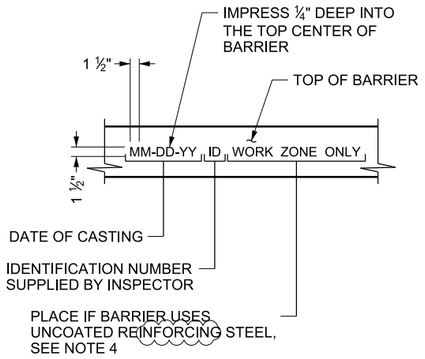


FORMED CONTRACTION JOINT



CAST-IN-PLACE BARRIER MARKING DETAIL

PLACE AT BEGINNING, END, AND AT 1,000-FT INTERVALS



PRECAST BARRIER MARKING DETAIL

LEGEND

A.S. = AS SHOWN
CIP = CAST-IN-PLACE
DIA = DIAMETER
EQ = EQUAL
R = RADIUS
SPA = SPACES

GENERAL NOTES:

1. PAVEMENT OVERLAY LIMITATIONS - EFFECTIVE BARRIER IS MEASURED FROM TOP OF PAVEMENT TO TOP OF BARRIER. DO NOT PLACE PAVEMENT OVERLAY THAT REDUCES EFFECTIVE BARRIER TO LESS THAN THE EFFECTIVE BARRIER LIMIT:
   A. 32 INCH NEW JERSEY BARRIER: DO NOT OVERLAY MATERIAL PAST THE FIRST BREAK POINT OF BARRIER. FIRST BREAK POINT IS 3 INCHES ABOVE BOTTOM OF BARRIER. EFFECTIVE BARRIER LIMIT IS 29 INCHES.
   B. 42 INCH CONSTANT SLOPE BARRIER: EFFECTIVE BARRIER LIMIT IS 36 INCHES
   C. 54 INCH CONSTANT SLOPE BARRIER: EFFECTIVE BARRIER LIMIT IS 48 INCHES.
2. USE CLASS AA(AE) CONCRETE.
3. USE COATED DEFORMED CARBON STEEL REINFORCEMENT BARS CONFORMING TO AASHTO M 284 OR M 111 AND AASHTO M 31 GRADE 60, RESPECTIVELY.
4. USE OF NON-COATED REINFORCING STEEL SCHEDULE ALLOWED FOR BARRIER SECTIONS CONSTRUCTED FOR USE IN WORK ZONE APPLICATIONS. MARK AS "WORK ZONE ONLY." SEE "PRECAST BARRIER MARKING DETAIL." DO NOT USE BARRIER MARKED AS "WORK ZONE ONLY" IN PERMANENT APPLICATIONS.
5. CONSTRUCT BARRIER BY FIXED FORM OR SLIP FORM METHOD.
6. PLACE A VERTICAL CONSTRUCTION JOINT AT END OF DAY'S POUR AND WHEN WORK IS HALTED FOR MORE THAN 2 HOURS.
7. PROVIDE END SECTION AT BARRIER ENDS AND AT INTERRUPTIONS IN THE BARRIER INCLUDING EXPANSION JOINTS AND CRASH CUSHIONS.
8. SEE STD DWG GW 6B FOR DELINEATION HARDWARE AND STD DWG GW 7A FOR DELINEATION SPACING.
9. PROVIDE 1.5 INCH MINIMUM COVER TO REINFORCING STEEL UNLESS NOTED OTHERWISE. REINFORCING STEEL DIMENSIONS ARE OUT TO OUT AND INSIDE BEND RADII ARE SHOWN. BEND STIRRUPS OUT OF PLANE IF NECESSARY TO MEET MINIMUM CLEARANCE.
10. LOCATE EXPANSION JOINTS IN CONCRETE BARRIER AT ALL TRANSITIONS AND APPROACH SLABS. USE A TYPE 1 EXPANSION JOINT AT TRANSITIONS. USE A TYPE 2 EXPANSION JOINT AT APPROACH SLABS.
11. INSTALL ELECTRICAL/ATMS CONDUITS, JUNCTION BOXES, AND PULL BOXES AS REQUIRED PER CONTRACT DOCUMENTS.
12. SAW OR CUT CONTRACTION JOINTS 1 INCH DEEP AT PAVEMENT TRANSVERSE JOINTS OR AT 15 FT MAX SPACING WHEN PLACED ON ASPHALT PAVEMENT. SAW OR CUT WITHIN 10 HOURS OF CONCRETE PLACEMENT. USE FORM CONTRACTION JOINT DETAIL IF PLACING BARRIER BY FORM METHOD.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

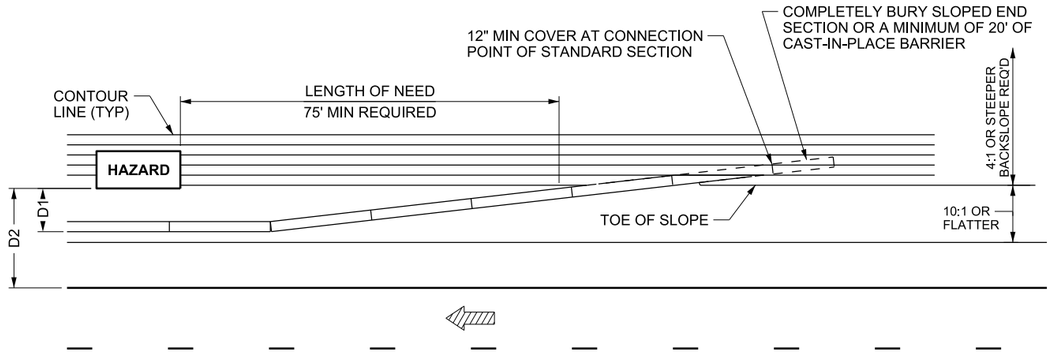
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

CONCRETE BARRIER
GENERAL NOTES AND
STANDARD DETAILS
1 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1A1

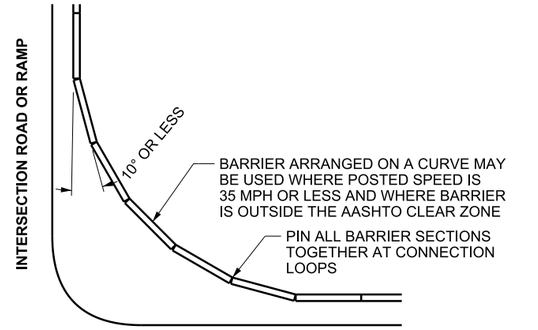


LENGTH OF NEED (LON) FORMULAS FOR BURIED END SECTION

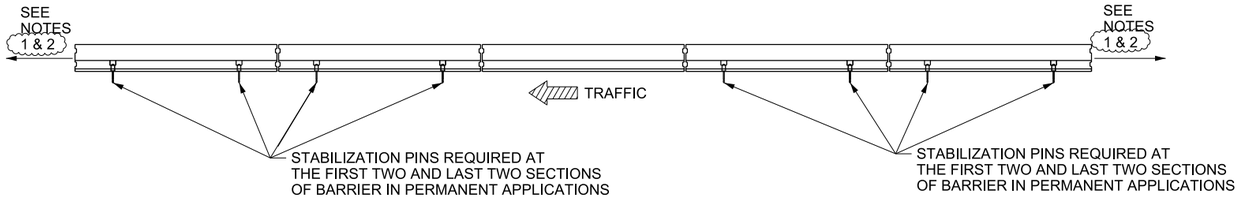
BACKSLOPE STEEPER THAN 3:1
LON = FLR x D1

BACKSLOPE 3:1 TO A MINIMUM 4:
≥ 5O MPH "LON"= 450 - (15 x D2)
≤ 45 MPH "LON"= 250 - (15 x D2)

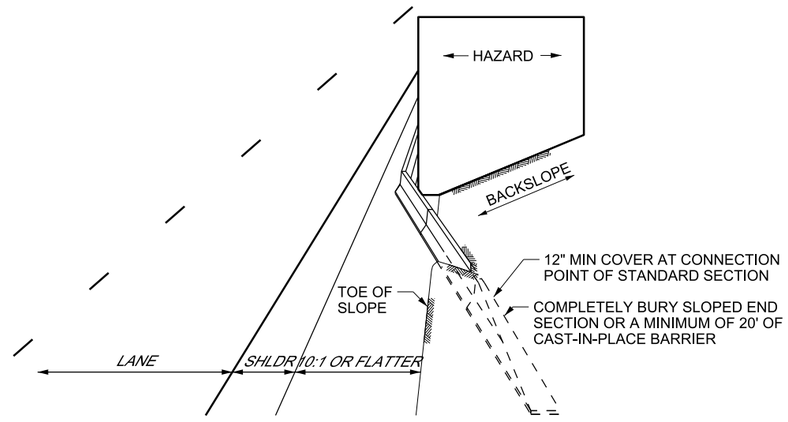
LON: LENGTH OF NEED
FLR: BARRIER FLARE RATE
D1: DISTANCE FROM FACE OF BARRIER TO FACE OF HAZARD OR DITCH BOTTOM
D2: DISTANCE FROM EDGE OF TRAVEL LANE TO FACE OF HAZARD OR DITCH BOTTOM



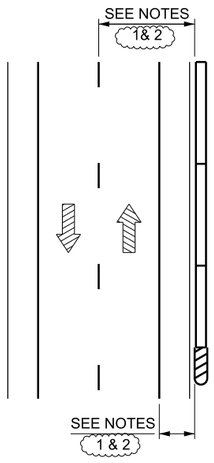
BURIED END SECTION PLAN



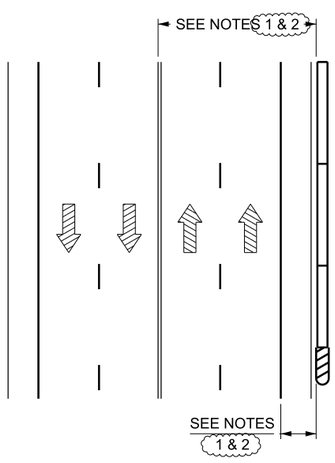
CURVED LAYOUT



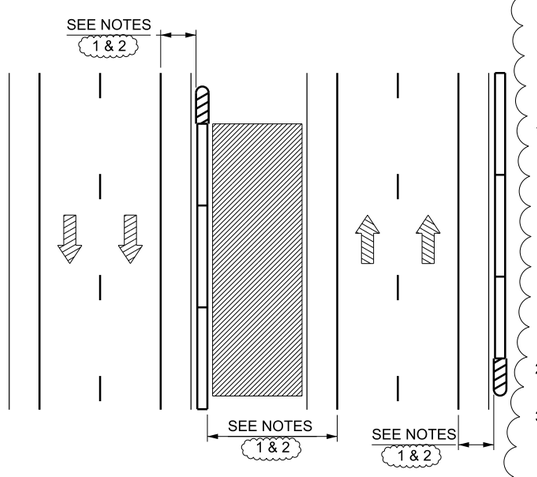
TYPICAL ELEVATION



TWO LANE / TWO WAY



MULTI-LANE ARTERIAL



MULTI-LANE ARTERIAL WITH TRAVERSABLE MEDIAN

BURIED END SECTION PERSPECTIVE VIEW

GENERAL NOTES:

1. INSTALL APPROPRIATE END TREATMENT, CRASH CUSHION, OR END SECTION WHEN BARRIER END IS WITHIN THE MAXIMUM REQUIRED AASHTO CLEAR ZONE. DO NOT EXTEND FLARED BARRIER IN ORDER TO MOVE END OF BARRIER OUTSIDE OF CLEAR ZONE TO AVOID USING END PROTECTION.
   A. SELECT APPROPRIATE END TREATMENT OR CRASH CUSHION FROM THE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS WHEN DESIGN SPEED EXCEEDS 40 MPH. USE AN END TREATMENT WHEN RECOVERY AREA BEHIND SELECTED SYSTEM IS ACHIEVED.
   B. APPROACH END NON-DIVIDED ROADWAYS: INSTALL A SLOPED END SECTION WHEN DESIGN SPEED FOR ROADWAY IS 40 MPH OR LESS. USE APPROPRIATE SECTION FOR BARRIER TYPE.
   C. TRAILING END NON-DIVIDED ROADWAYS: INSTALL A SLOPED END SECTION ON TRAILING ENDS WHEN AN END TREATMENT OR CRASH CUSHION IS NOT REQUIRED.
2. INSTALL APPLICABLE BARRIER TRANSITION PRIOR TO INSTALLING W-BEAM, END TREATMENT, OR CRASH CUSHION WHEN A CONSTANT SLOPE SYSTEM IS USED.
3. PLACEMENT WITH CURBS:
   A. 32 INCH BARRIER: 10-FT SET BACK REQUIRED FROM FACE OF CURB.
   B. 42 INCH AND 54 INCH BARRIER: 10-FT SET BACK RECOMMENDED FROM FACE OF CURB.
4. SLOPED END SECTION DOES NOT NEED TO BE PLACED ON A PAVED SURFACE WHEN USED IN A BURIED END SECTION APPLICATION.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.

REVISIONS

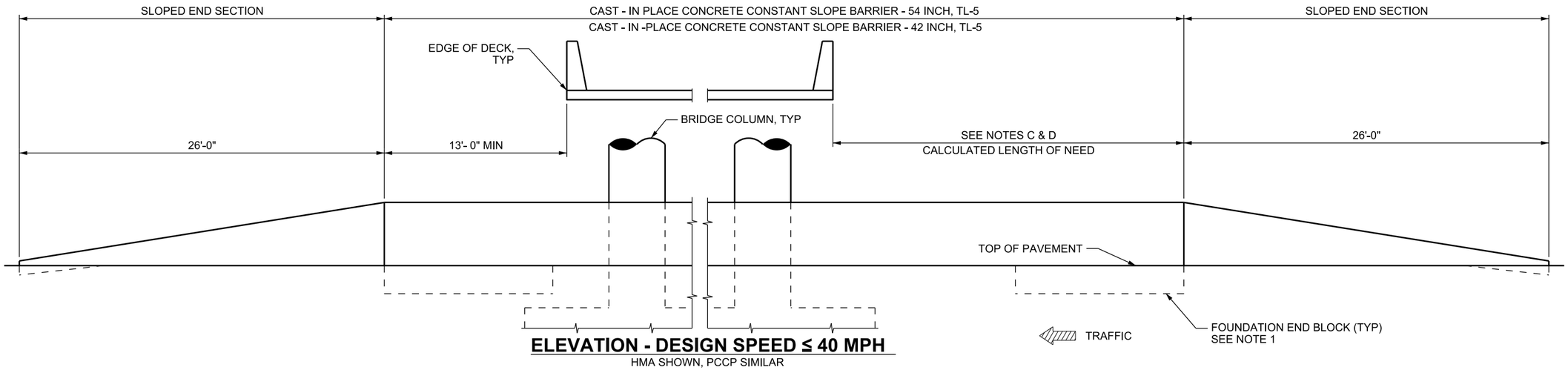
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

		DATE
RECOMMENDED FOR APPROVAL		AUG. 29, 2019
CHAIRMAN STANDARDS COMMITTEE APPROVED		AUG. 29, 2019
DEPUTY DIRECTOR		DATE

CONCRETE BARRIER LAYOUT

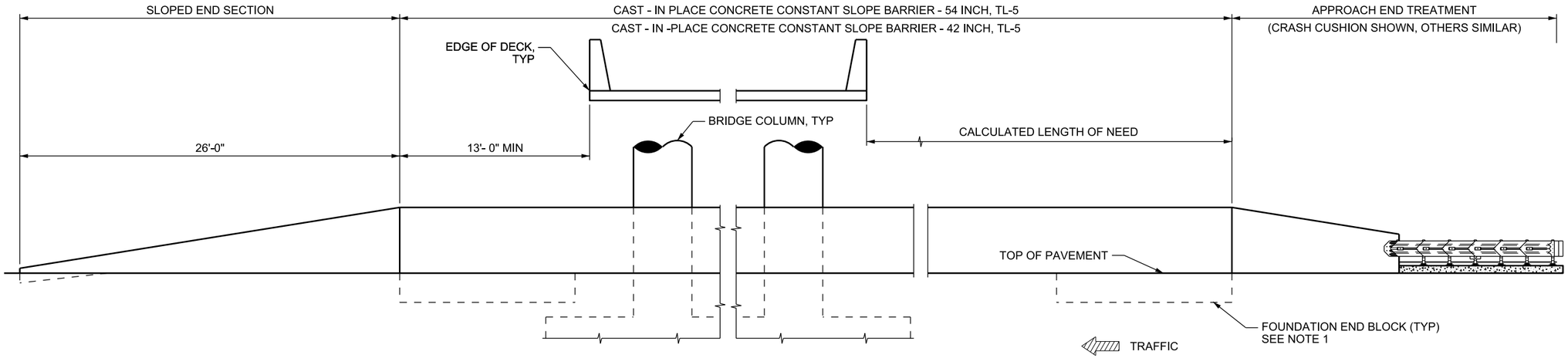
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1D



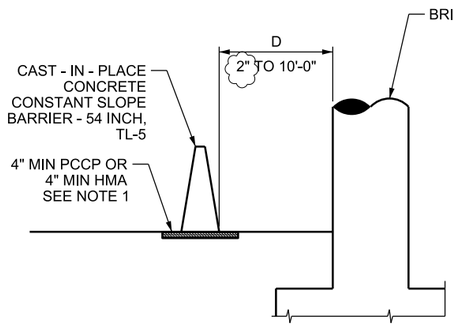
ELEVATION - DESIGN SPEED ≤ 40 MPH

HMA SHOWN, PCCP SIMILAR



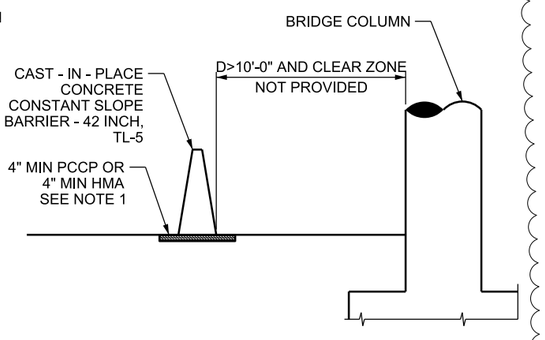
ELEVATION - DESIGN SPEED > 40 MPH

HMA SHOWN, PCCP SIMILAR



SECTION

D = 4'-0" TO 10'-0"



SECTION

D > 10'-0"

NOTES:

1. SEE STD DWGS BA 3E1 AND BA 3O1 FOR FOUNDATION END BLOCK DETAILS. FOUNDATION END BLOCKS ARE NOT REQUIRED WHEN BARRIERS ARE PLACED ON PCCP OF 8 INCH THICKNESS OR GREATER.
2. PLACEMENT OF FILL MATERIAL BETWEEN COLUMN AND BACK OF BARRIER IS NOT ALLOWED ABOVE BARRIER FOUNDATION.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS. MOVED DESIGN COLUMN IMPACT LOAD DETAIL TO DM SHEET.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

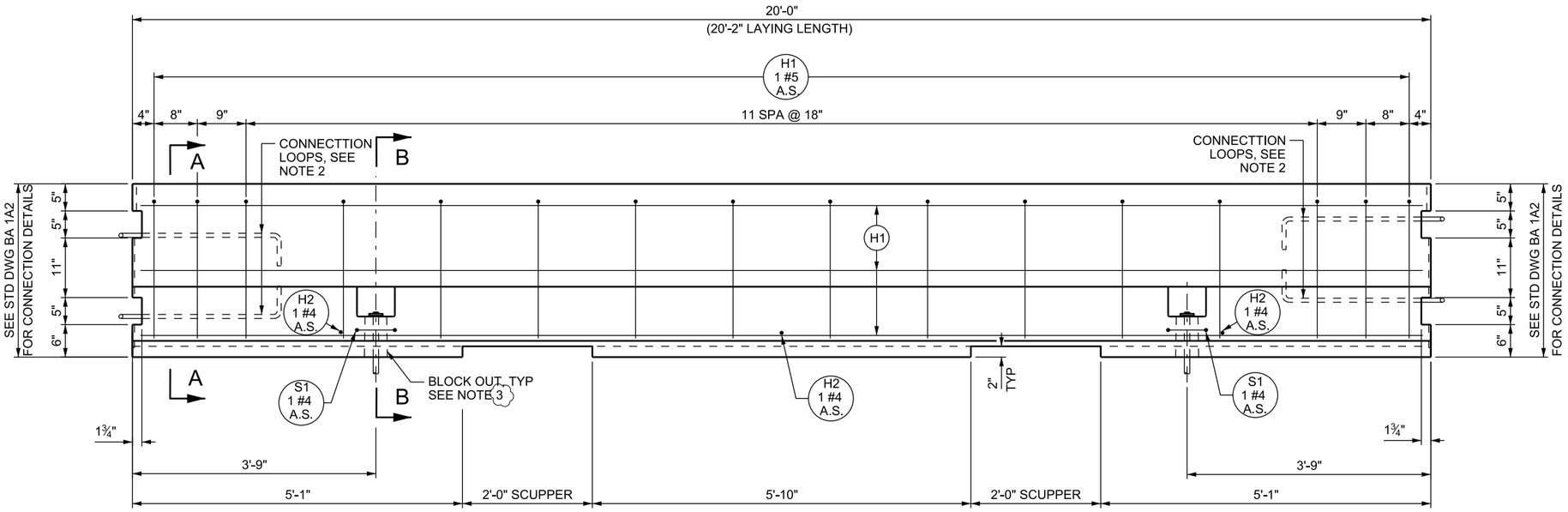
CONCRETE BARRIER COLUMN PROTECTION

STANDARD DRAWING TITLE

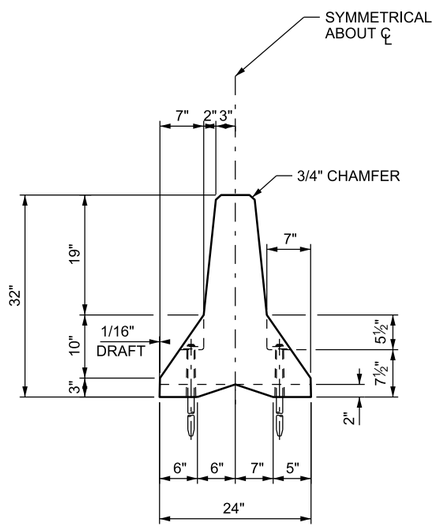
STD. DWG. NO.

BA 1E

08-AUG-2019 DGN File: D:\Standardsandspecssection\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA01E DM.dgn

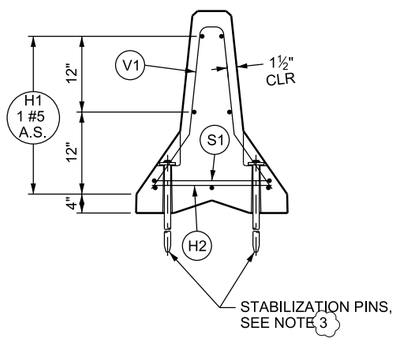


ELEVATION



SECTION A-A

REBAR NOT SHOWN FOR CLARITY



SECTION B-B

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	7	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-4"
H2	#4	3	ABOVE H1 BAR AND TIED TO V1 BAR	18"
S1	#4	2	HORIZONTAL AROUND BLOCK OUTS TOTAL LENGTH = 5'-3 1/2"	18¼"; 7¼"; BLOCK OUTS; 1½" R, TYP; 12"
V1	#5	16	VERTICAL IN BARRIER TOTAL LENGTH = 4'-10 1/2"	3¾"; 16" TYP; 1¼" R; 17"; 10½" TYP; 29°; 12°; 29°; 8⅝"; 19"

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN" ON STD DWG BA 1A2 FOR DETAILS.
4. PROVIDE SUPPERS WHEN NOTED ON PLANS. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. EACH BARRIER UNIT WEIGHS 3.9 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

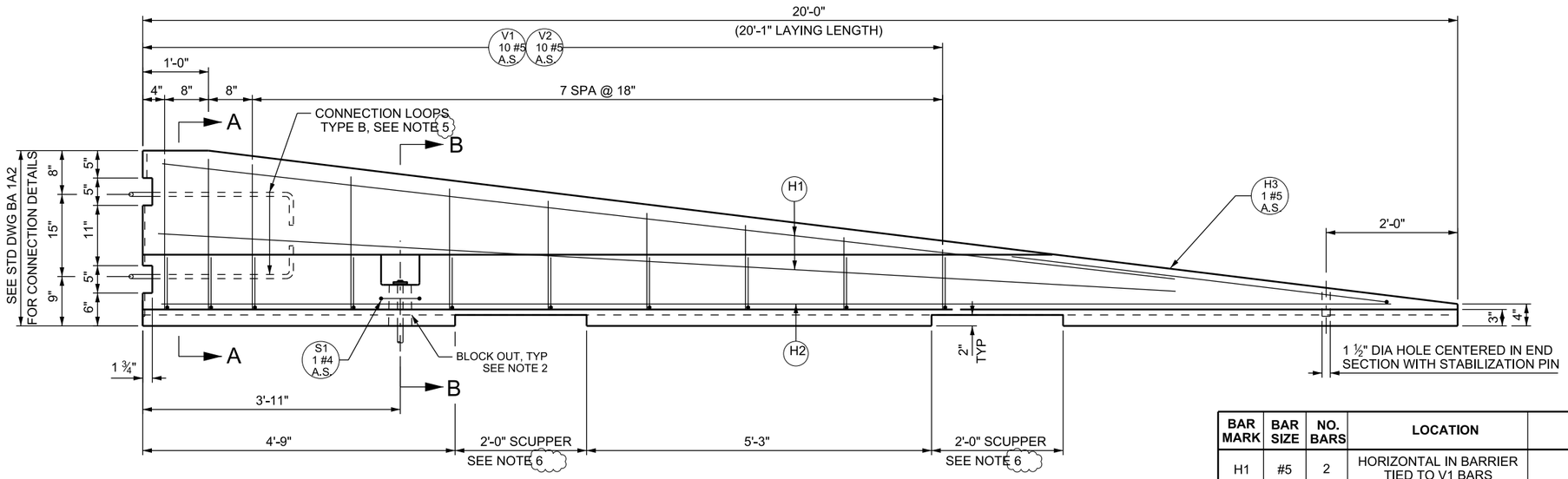
DEPUTY DIRECTOR

PRECAST CONCRETE BARRIER - 32 INCH NEW JERSEY SHAPE

STANDARD DRAWING TITLE

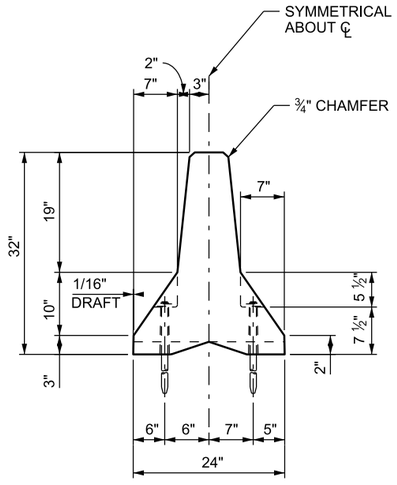
STD. DWG. NO.

BA 2A



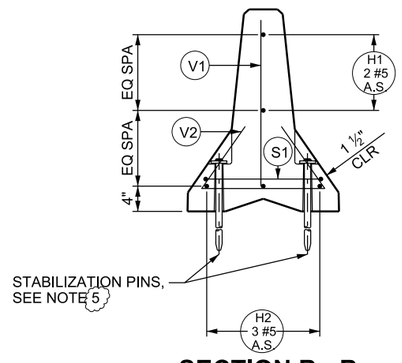
ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	2	HORIZONTAL IN BARRIER TIED TO V1 BARS	15'-6"
H2	#5	3	HORIZONTAL IN BOTTOM OF BARRIER AND TIED INSIDE V2 BARS	19'-1"
H3	#5	1	HORIZONTAL AT END OF BARRIER ALONG TOP SLOPE TOTAL LENGTH = 13'-9"	6'-0" TYP, 85° TYP, 1'-9"
S1	#4	1	HORIZONTAL AROUND BLOCK OUTS TOTAL LENGTH = 5'-3 1/2"	18 ¼", 7 ¼", BLOCK OUTS, 1 ½" R, TYP, 12"
V1	#5	10	VERTICAL IN BARRIER	L: 27" (2), 26" (1), 24" (1), 22" (1), 20" (1), 17" (1), 15" (1), 13" (1), 11" (1)
V2	#5	10	VERTICAL IN BARRIER TIE TO V1 BARS TOTAL LENGTH = 3'-7 1/2"	12", 55°, 55°, 12", 19½"



SECTION A - A

REBAR NOT SHOWN FOR CLARITY



SECTION B - B

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. USE A SLOPED END SECTION AS ALLOWED ON STD DWG BA 1D.
3. USE PERMITTED IN WORK ZONES WHEN POSTED SPEED IS 40 MPH OR LESS PRIOR TO THE START OF THE CONSTRUCTION PROJECT.
4. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
5. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN" ON STD DWG BA 1A2 FOR DETAILS.
6. PROVIDE SCUPPERS WHEN NOTED ON PLANS. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
7. INSTALL STABILIZATION PINS IN ALL APPLICATIONS.
8. SLOPED END SECTION WEIGHS 2.6 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

PRECAST CONCRETE BARRIER - 32 INCH NEW JERSEY SHAPE, SLOPED END SECTION (FOR SPEEDS ≤ 40 MPH)

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 2B

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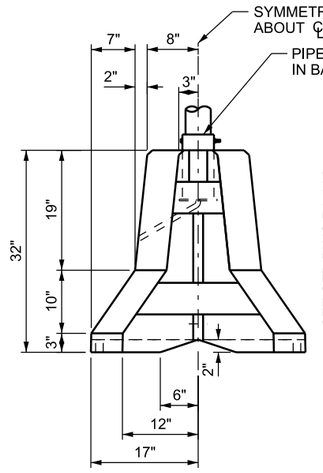
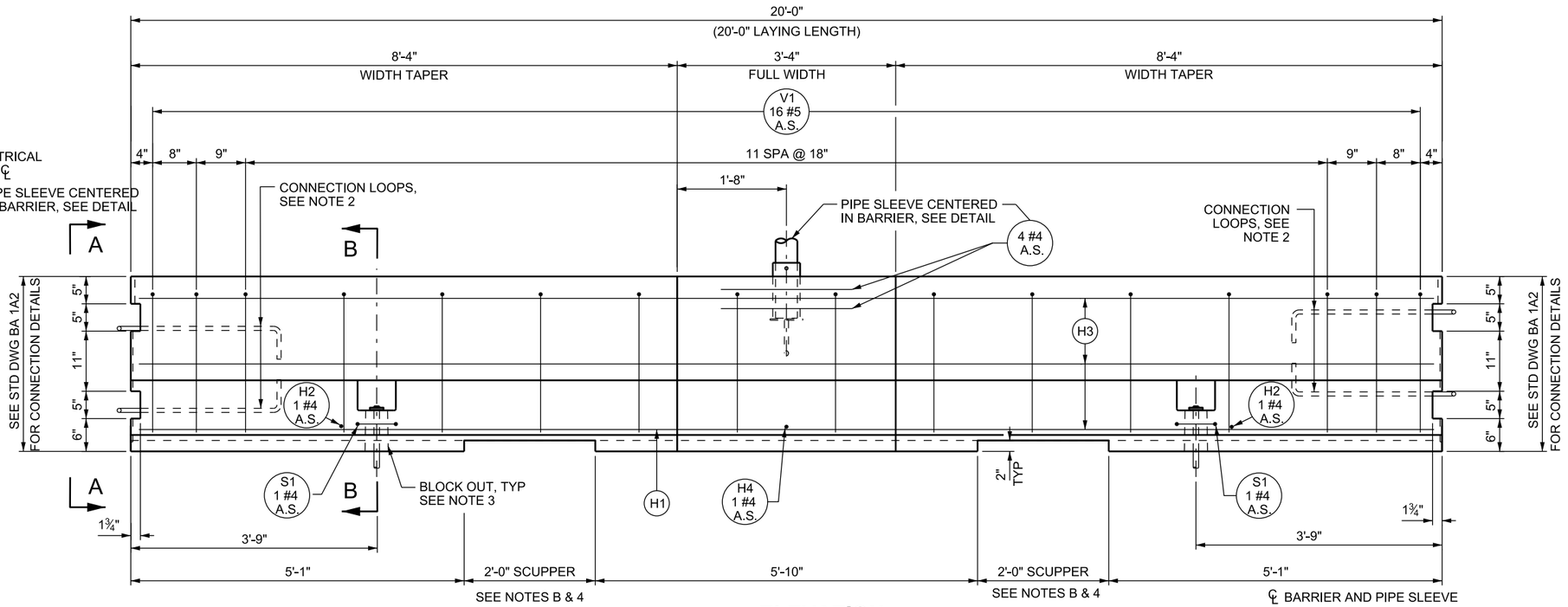
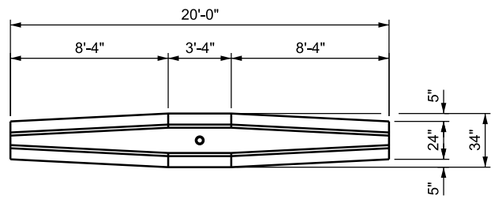
08-AUG-2019



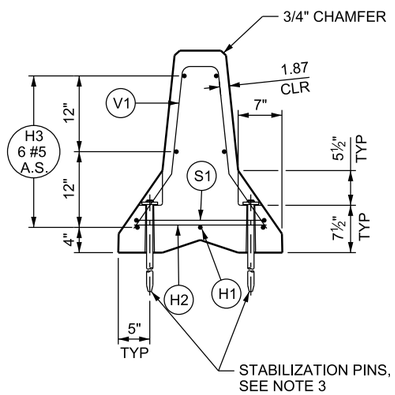
VIEW A-A



ELEVATION

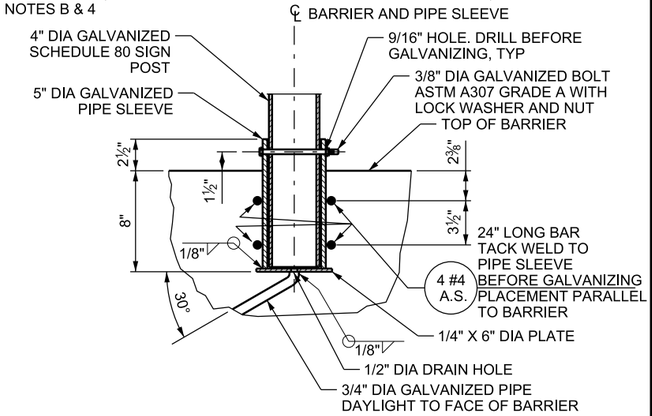


PLAN



SECTION B-B

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	1	HORIZONTAL IN CENTER BOTTOM OF BARRIER	19'-4"
H2	#4	2	ABOVE H3 BAR AND TIED TO V1 BAR	25"
H3	#5	6	HORIZONTAL IN BARRIER TIED TO V1 BARS	8'-2 1/2" 3'-4" 8'-2 1/2", 5"
H4	#4	1	ABOVE H3 BAR	31"
S1	#4	2	HORIZONTAL AROUND BLOCK OUTS TOTAL LENGTH = 6'-0 1/2"	22¾", 7¼", BLOCK OUTS, 1½" R, TYP, 12"
V1	#5	16	VERTICAL IN BARRIER	W: 3 1/2" QTY 2; 4 1/2" 2; 5 1/2" 2; 7" 2; 9" 2; 10 1/2" 2; 12 1/2" 2; 13" 2 16" TYP, 1¼" R, 17", 10½" TYP, 29°, 29°, 8⅝", 12°



PIPE SLEEVE DETAIL

DESIGN-ONLY NOTES:

A. SEE STD DWG BA 1B THROUGH BA 1D FOR TYPICAL LAYOUT REQUIREMENTS.
B. INDICATE ON PLAN SET WHEN BARRIER SECTIONS WITH SCUPPERS ARE REQUIRED.

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES. A.SEE STD DWG BA 1B THROUGH BA 1D FOR TYPICAL LAYOUT REQUIREMENTS
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN" ON STD DWG BA 1A2 FOR DETAILS.
B. SEE DESIGN PLAN SET WHEN BARRIER SECTIONS WITH SCUPPERS ARE REQUIRED.
4. PROVIDE SCUPPERS AS SHOWN. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE SN SERIES STD DWG FOR SIGN MOUNTING, HARDWARE, AND PLACEMENT REQUIREMENTS. MAXIMUM SIGN PANEL AREA IS 36 SQ FT.
6. USE PIPES CONFORMING TO ASTM A 53 GRADE B, ASTM A 500 GRADE B, OR ASTM API 5L GRADE B/X42. GALVANIZE IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION IS COMPLETED.
7. EACH BARRIER UNIT WEIGHS 5.9 TONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN. 01, 2017 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN. 01, 2017 DATE

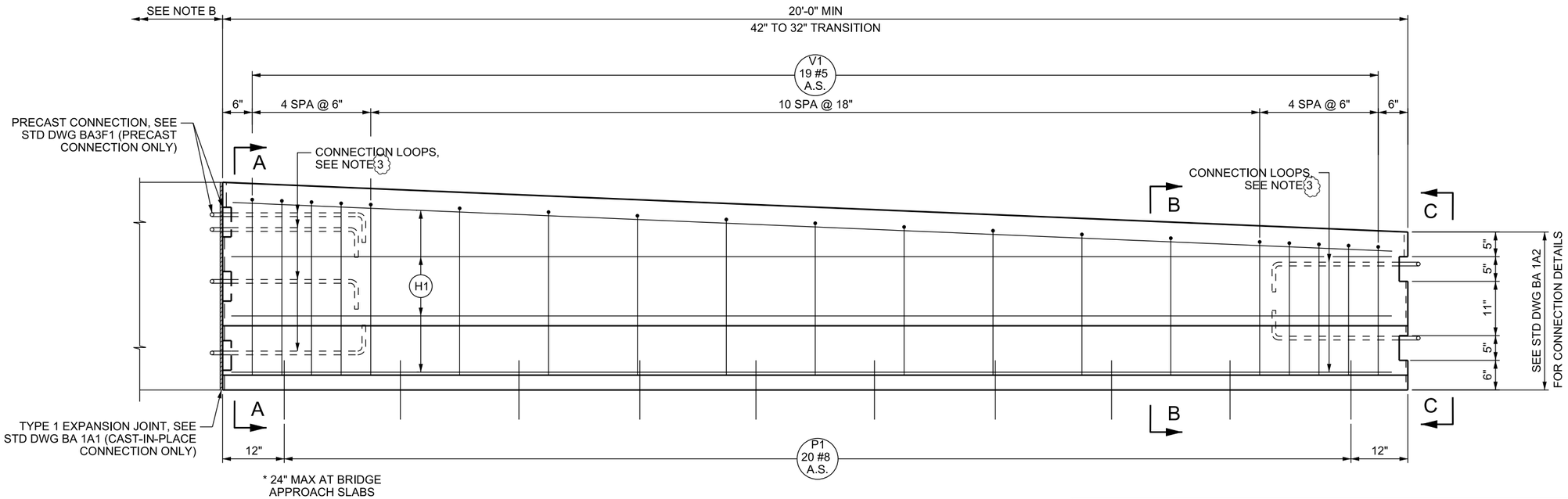
DEPUTY DIRECTOR

PRECAST CONCRETE BARRIER - 32 INCH NEW JERSEY SHAPE, MEDIAN SMALL SIGN SECTION

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 2C



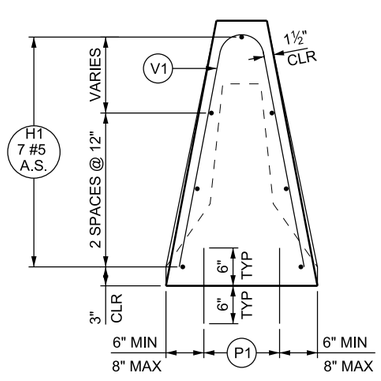
ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	7	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-3"
P1	#8	20	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	12" OPTION 1; 12", 3" OPTION 2
V1	#5	19	VERTICAL IN BARRIER	

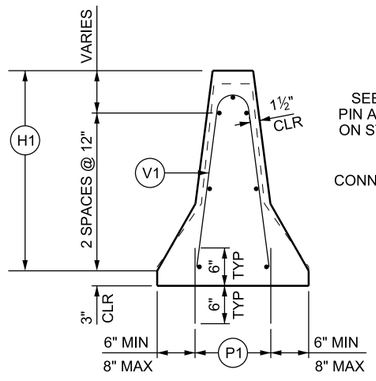
H	W	QTY
36 1/2"	19 1/2"	1
36"	19"	1
36"	19"	1
35 1/2"	18 1/2"	1
35 1/2"	18 1/2"	1
34 1/2"	17 1/2"	1
34"	17"	1
33"	16"	1
32 1/2"	15"	1
31 1/2"	14 1/2"	1
31"	13 1/2"	1
30"	13"	1
29 1/2"	12"	1
28 1/2"	11"	1
28"	10 1/2"	1
27 1/2"	10"	1
27 1/2"	9 1/2"	1
27"	9"	1
27"	9"	1

H, W, * R

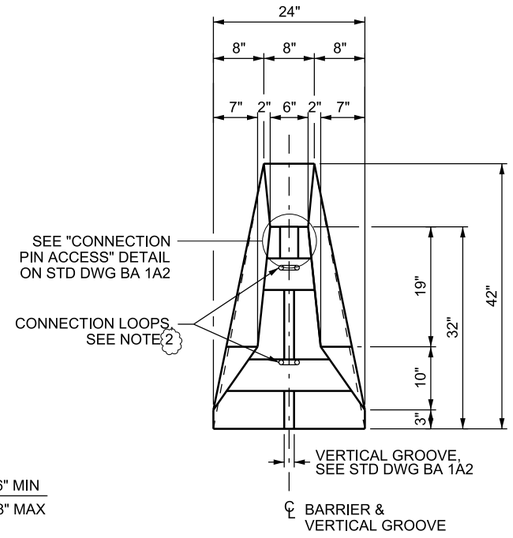
* BEND RADIUS VARIES OVER LENGTH OF BARRIER TRANSITION SECTION



SECTION A-A



SECTION B-B



VIEW C-C

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS. PLACE THE APPROPRIATE CONNECTION LOOP CONFIGURATION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
4. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS.
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

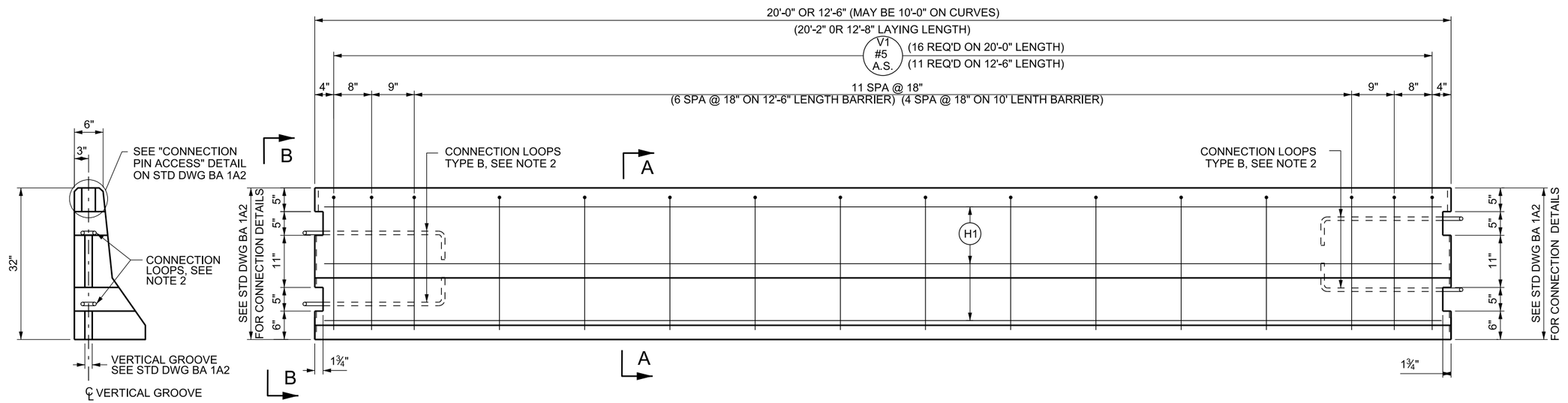
CAST-IN-PLACE CONCRETE BARRIER - 32 INCH NEW JERSEY SHAPE, 42 INCH CONSTANT SLOPE BARRIER TRANSITION

STANDARD DRAWING TITLE

STD. DWG. NO.

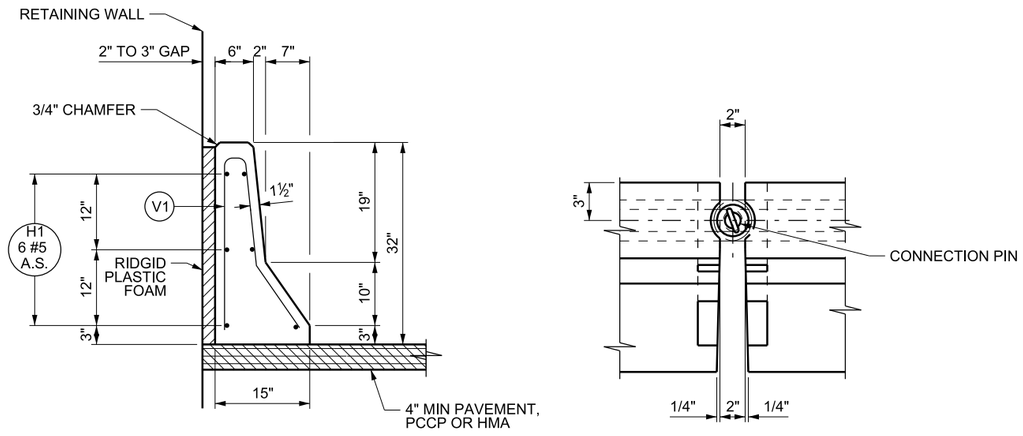
BA 2D

08-AUG-2019 DGN File: D:\Standardsandspecssection\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA02D DM.dgn



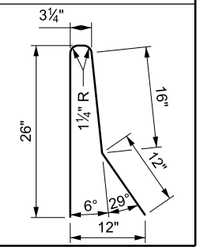
VIEW B-B

ELEVATION



SECTION A-A
AT RETAINING WALL

PARTIAL PLAN

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	6	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-4" OR 11'-10"
V1	#5	16 (20'-0" LENGTH) OR 11 (12'-6" LENGTH) OR 10 (10' LENGTH)	VERTICAL IN BARRIER TOTAL LENGTH = 4'-10 1/2"	

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. DO NOT USE AS RETAINING BARRIER. REFER TO STD DWG BA 1C FOR RETAINING BARRIER APPLICATIONS.
4. USE ONLY IN FRONT OF A RETAINING WALL. DO NOT USE IN A WORK ZONE APPLICATION.
5. BARRIER UNIT WEIGHT: 3.0 TONS (20'-0" LENGTH)
   1.9 TONS (12'-6" LENGTH)

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

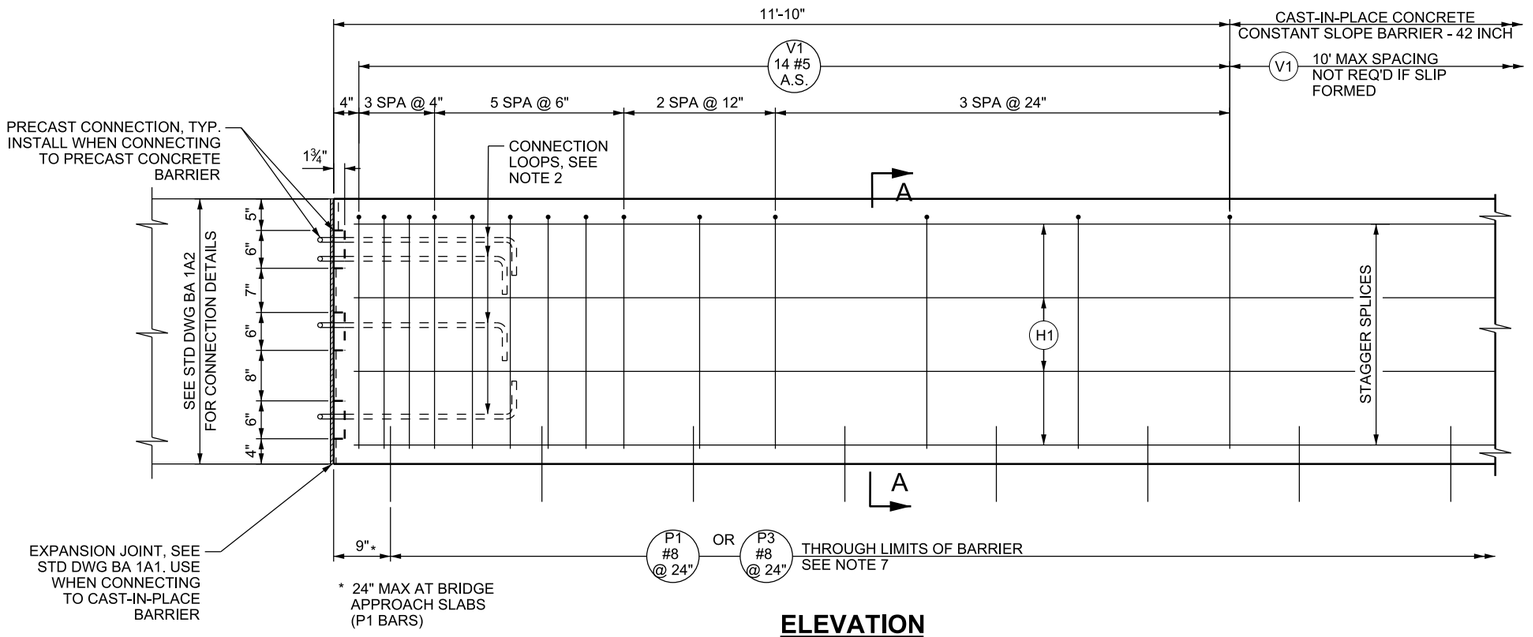
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

PRECAST CONCRETE
HALF BARRIER - 32 INCH
NEW JERSEY SHAPE

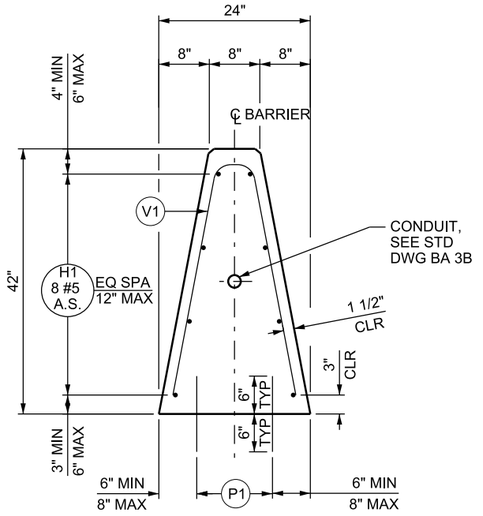
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2E

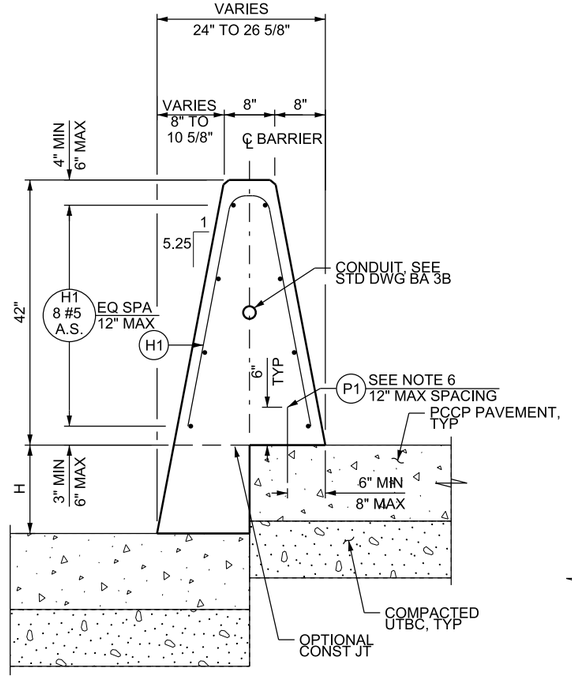


ELEVATION

42" CONSTANT SLOPE BARRIER SHOWN,
STEPPED MEDIAN BARRIER SIMILAR

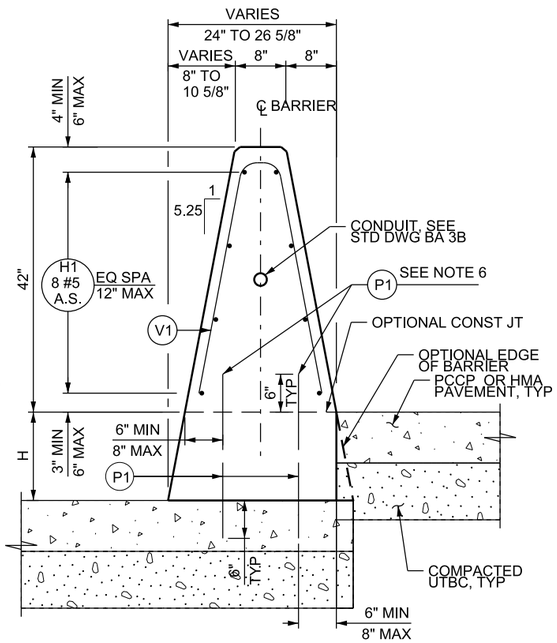


SECTION A-A



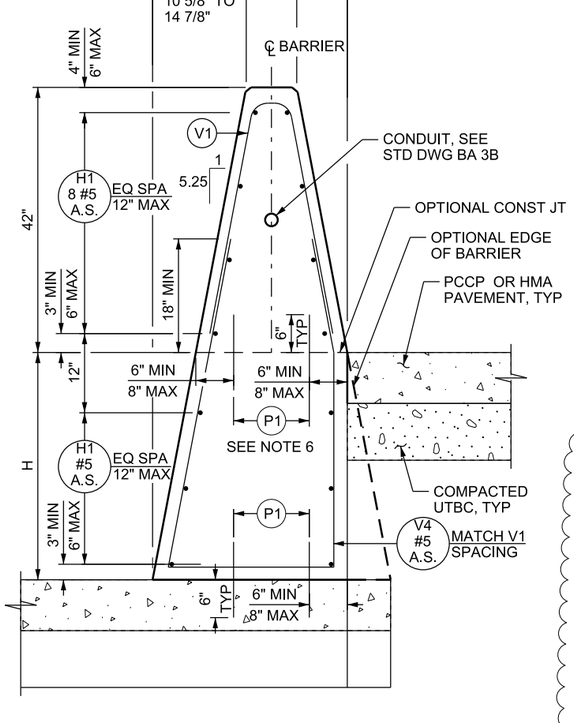
STEPPED MEDIAN BARRIER

H = 0" TO 14" (PCCP ONLY)



STEPPED MEDIAN BARRIER

H = 0" TO 14" (PCCP HMA)



STEPPED MEDIAN BARRIER

H = 14" TO 36"

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE STD DWG BA 3A2 FOR ADDITIONAL END SECTION DETAILS.
4. SEE STD DWG BA 3A3 FOR REINFORCING SCHEDULE AND NOTES.
5. V4 BAR SPACING MATCHES V1 SPACING SHOWN IN ELEVATION.
6. P1 BARS THROUGH THE OPTIONAL CONSTRUCTION JOINT ARE NOT REQUIRED IF THE CONSTRUCTION JOINT IS NOT USED OR IF THE V4 BARS ARE PRESENT.
7. USE A MAXIMUM OF 12 INCH SPACING FOR P1 BARS. SEE STEPPED MEDIAN BARRIER DETAILS FOR APPLICABLE LOCATION.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO CONSTRUCTION NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

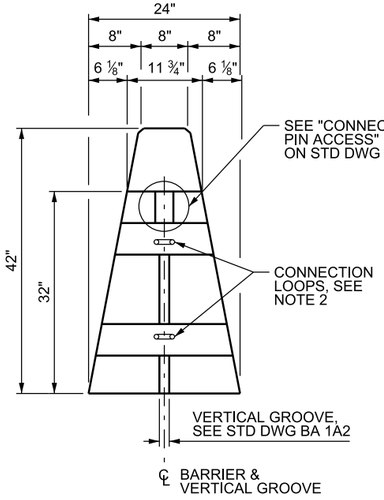
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

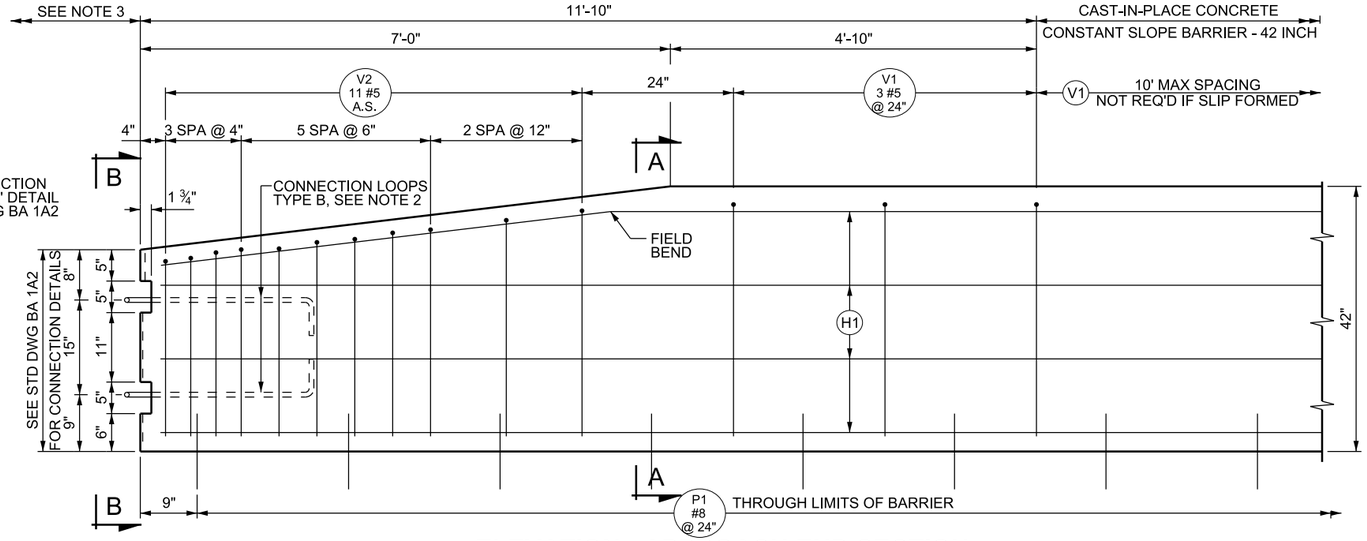
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH
1 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3A1

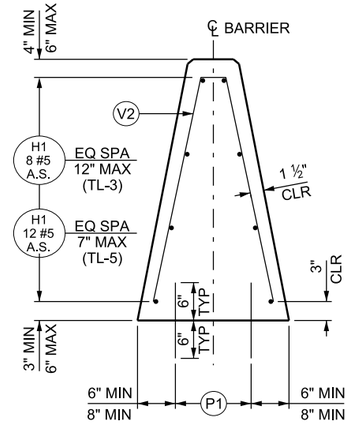


VIEW B - B



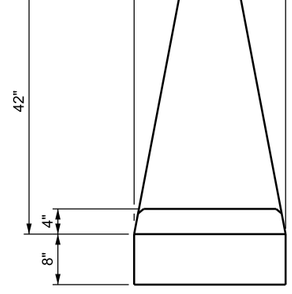
ELEVATION - APPROACH END SECTION

TL-3 SHOWN; TL-5 SIMILAR

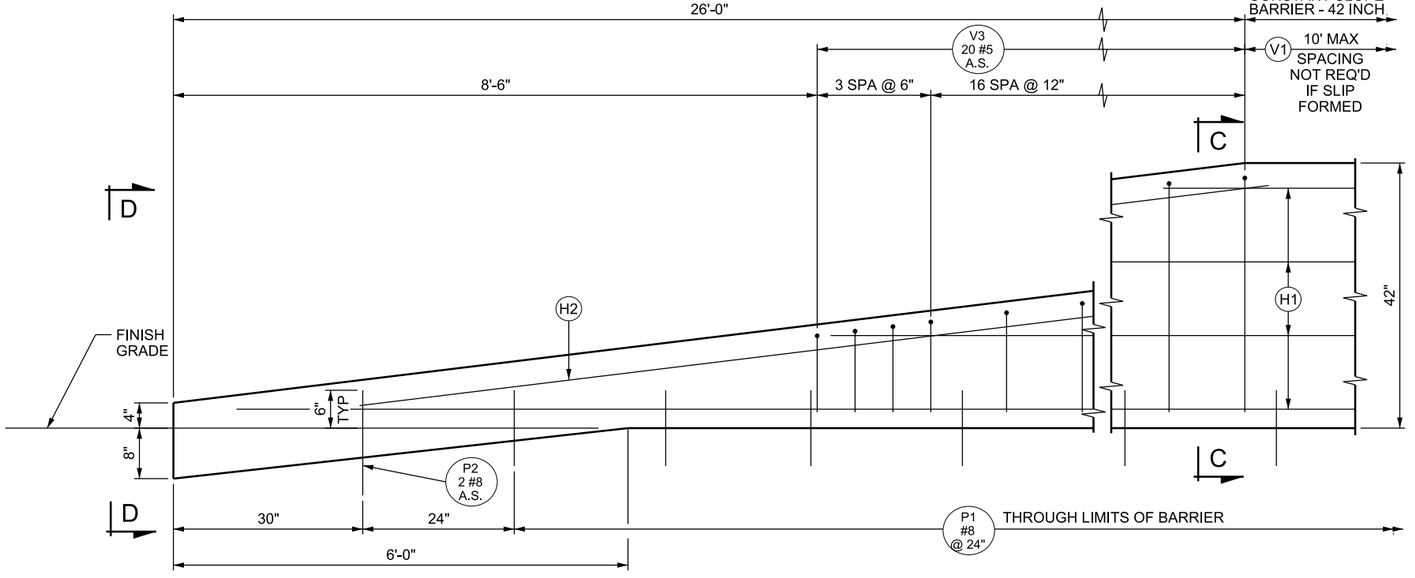


SECTION A - A

TL-3 SHOWN; TL-5 SIMILAR

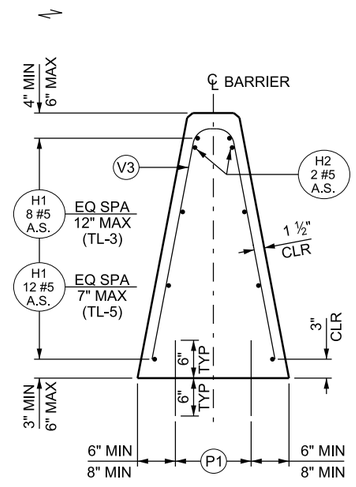


VIEW D - D



ELEVATION - TRAILING SLOPED END SECTION

TL-3 SHOWN; TL-5 SIMILAR



SECTION C - C

TL-3 SHOWN; TL-5 SIMILAR

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE STD DWG BA 3A3 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. USE H1 AND P1 BARS CONSISTENT WITH THE TEST LEVEL RATING OF ADJACENT BARRIER.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

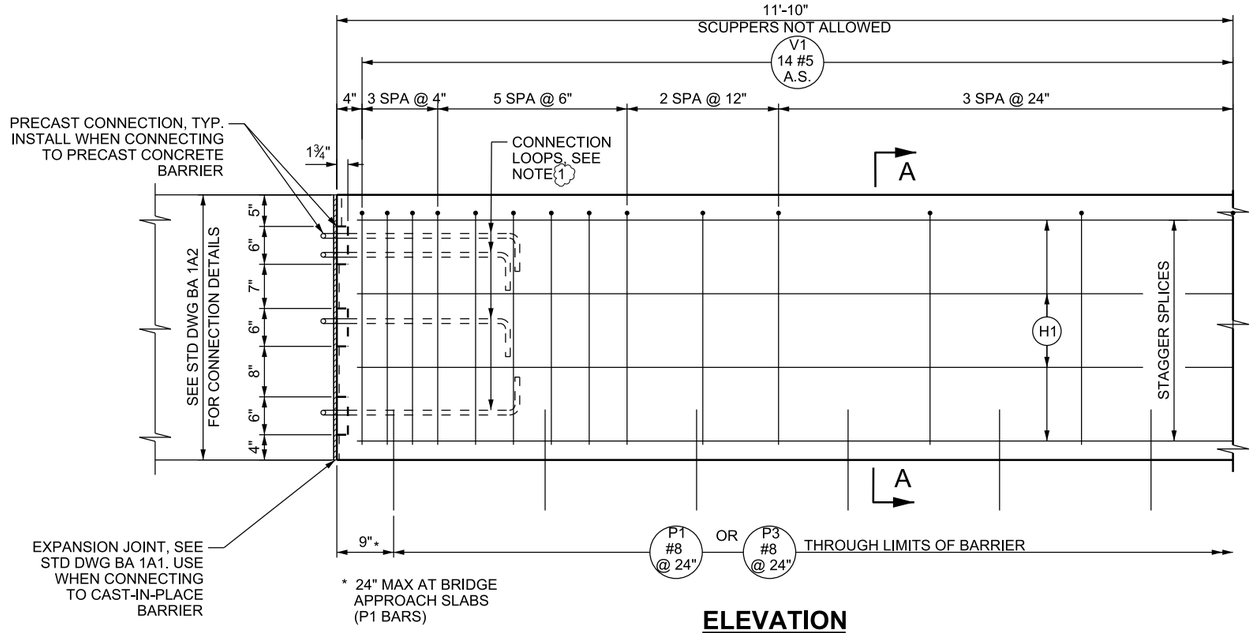
DEPUTY DIRECTOR

CAST - IN - PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH 2 OF 3

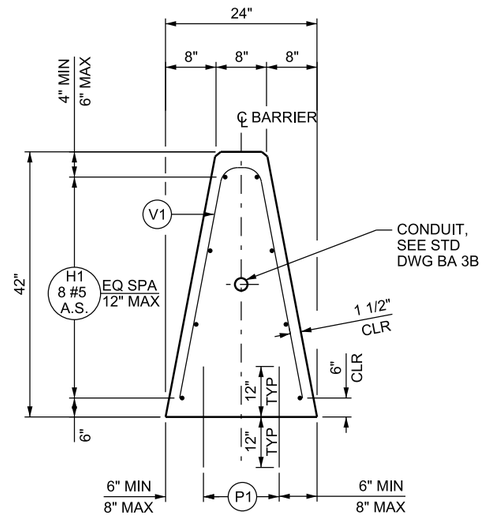
STANDARD DRAWING TITLE

STD. DWG. NO.

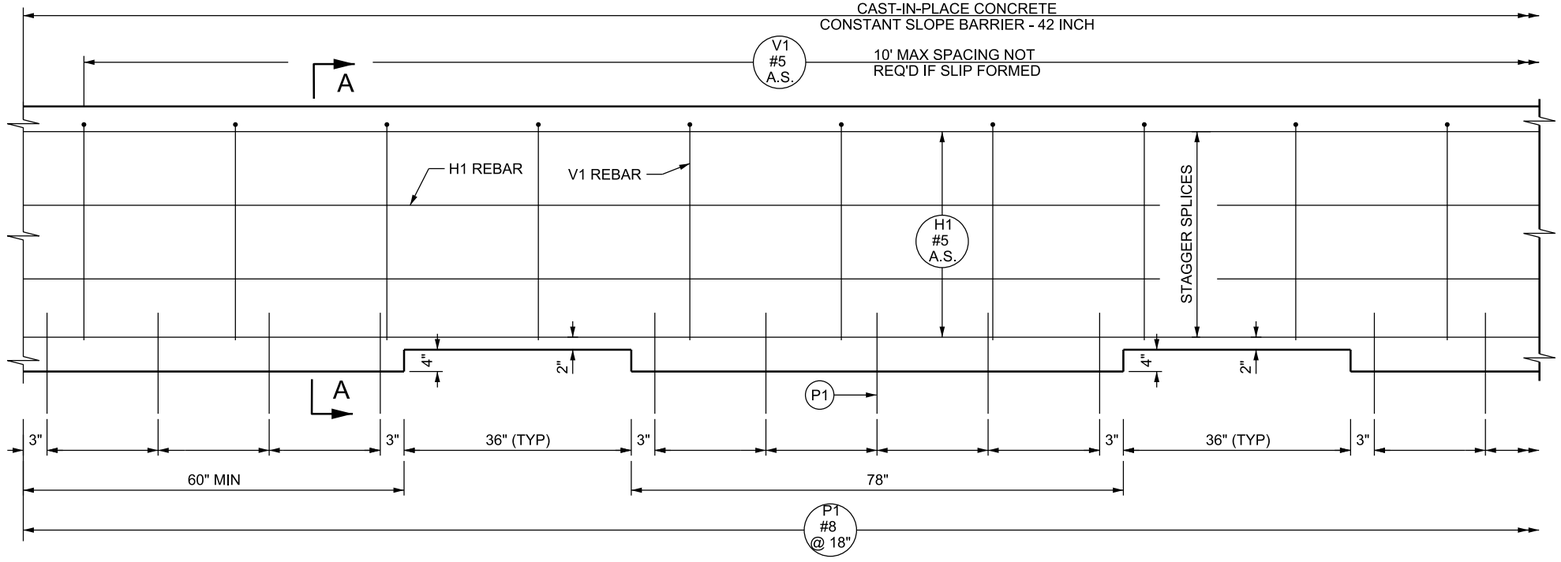
BA 3A2



ELEVATION



SECTION A-A



ELEVATION

NOTES:

1. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
3. SEE STD DWG BA 3A3 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3A2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
6. SEE STD DWG BA 1A1 FOR GENERAL NOTES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO CONSTRUCTION NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

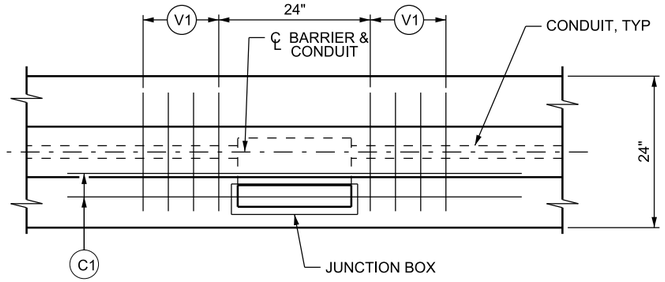
RECOMMENDED FOR APPROVAL	AUG. 29, 2019	DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG. 29, 2019	DATE
DEPUTY DIRECTOR		

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER WITH SCUPPERS - 42 INCH

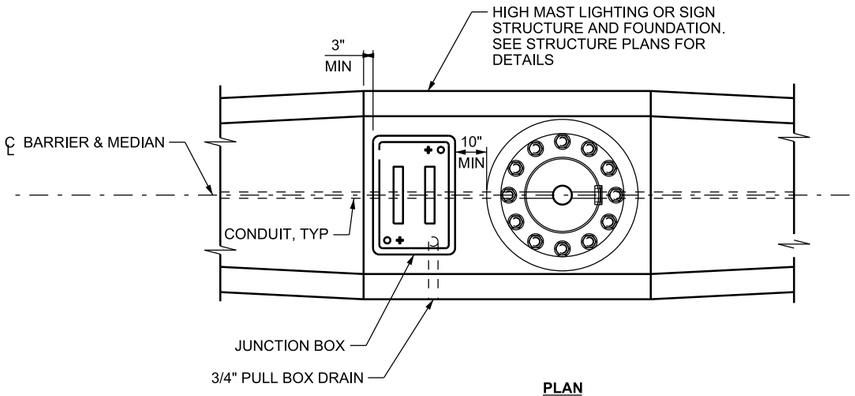
STANDARD DRAWING TITLE

STD. DWG. NO.

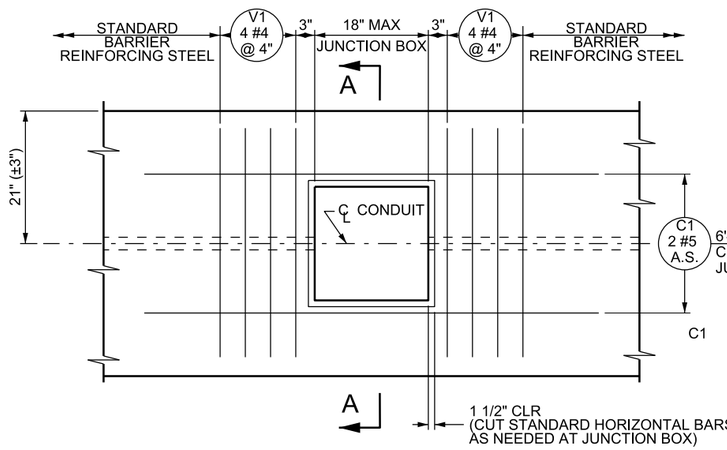
BA 3A4



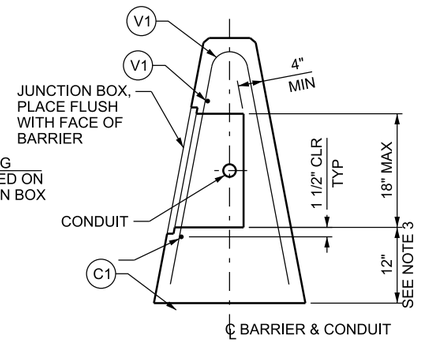
PLAN



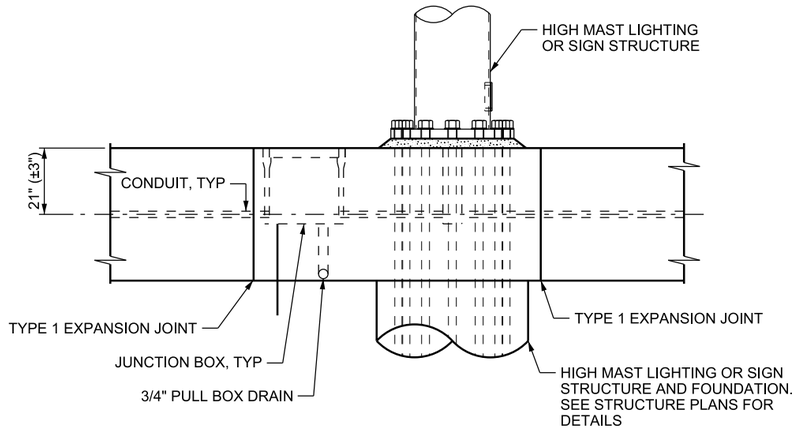
PLAN



ELEVATION



SECTION A-A



ELEVATION

MEDIAN BARRIER CONDUIT

STANDARD REINFORCING STEEL NOT SHOWN

MEDIAN BARRIER CONDUIT AT SIGN OR LIGHT STRUCTURE

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. INSTALL ELECTRICAL AND ATMS CONDUITS, JUNCTION BOXES, AND PULL BOXES PER CONTRACT DRAWINGS.
3. INCREASE HEIGHT TO ACCOUNT FOR STEPPED MEDIAN. MAINTAIN 12 INCHES TO TOP OF PAVEMENT ON THE HIGHEST SIDE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/28/2019	SDD	ADDED 3/4" PULL BOX DRAIN CALL OUT.
2	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO CONSTRUCTION NOTES.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

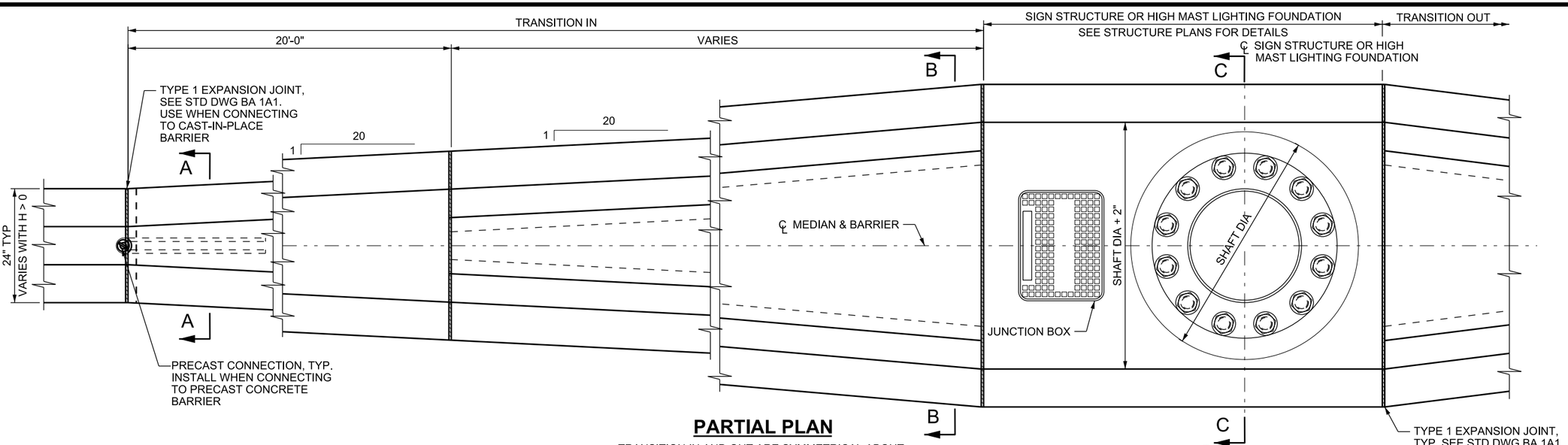
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, ELECTRICAL DETAILS

STANDARD DRAWING TITLE

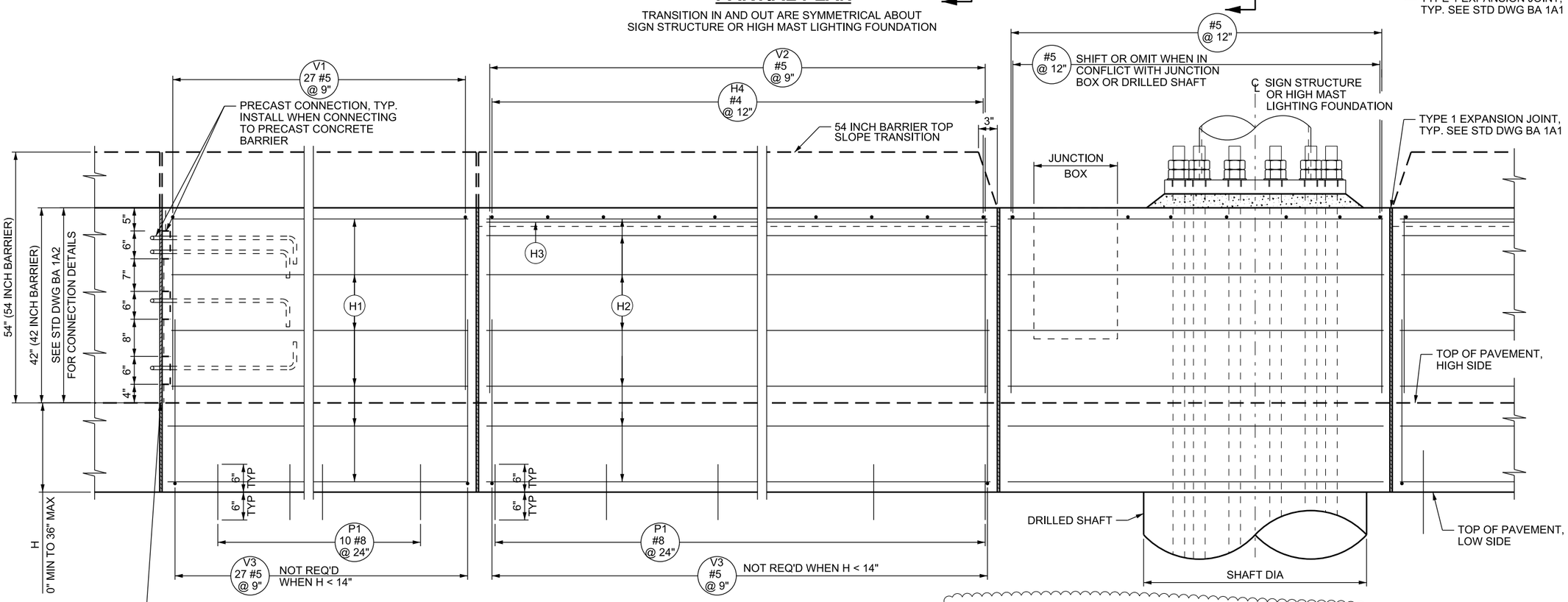
STD. DWG. NO.

BA 3B



PARTIAL PLAN

TRANSITION IN AND OUT ARE SYMMETRICAL ABOUT
SIGN STRUCTURE OR HIGH MAST LIGHTING FOUNDATION



PARTIAL ELEVATION

TRANSITION IN AND OUT ARE SYMMETRICAL ABOUT
SIGN STRUCTURE OR HIGH MAST LIGHTING FOUNDATION;
REINFORCING STEEL FOR 42 INCH BARRIER SHOWN, 54 INCH BARRIER SIMILAR

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3C2 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.
3. INSTALL ELECTRICAL AND ATMS CONDUITS, JUNCTION BOXES AND PULL BOXES ACCORDING TO CONTRACT DRAWINGS.
4. INCREASE LENGTH OF WIDTH TAPER AS NECESSARY TO PROVIDE APPROPRIATE FLARE RATE WHEN DESIGN PLANS SPECIFY ALTERNATIVE FLARE RATE. ADJUST REINFORCING STEEL LENGTHS AS NECESSARY.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

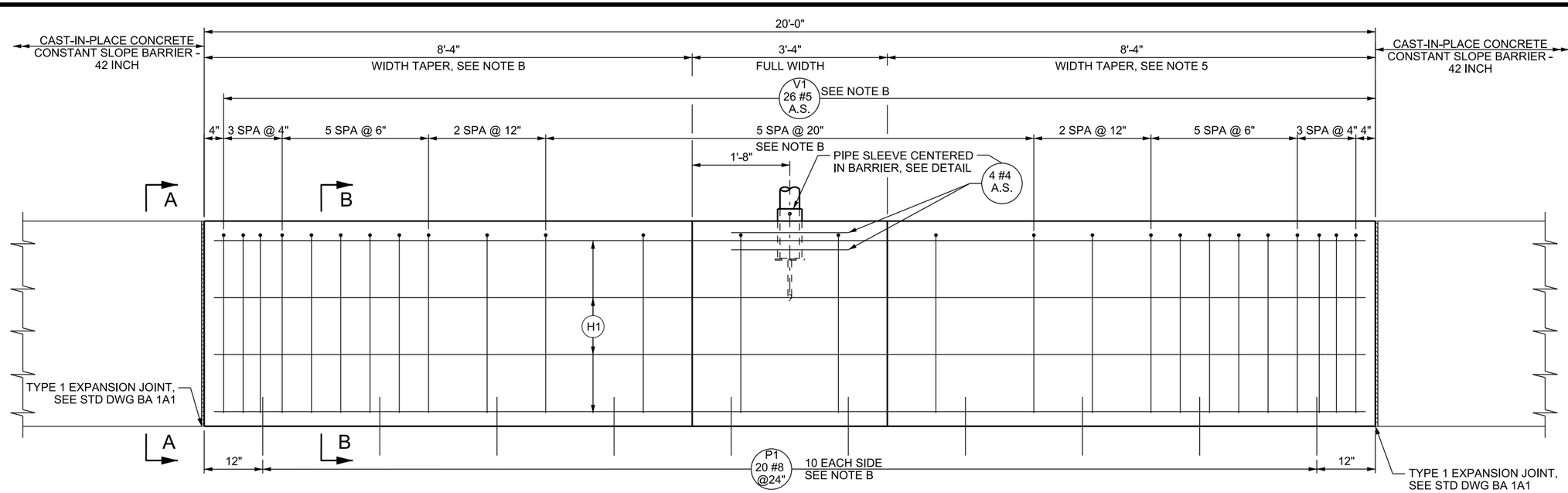
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, SIGN STRUCTURE FOUNDATION TRANSITION 1 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3C1

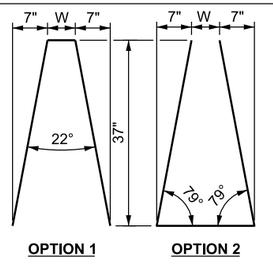


ELEVATION

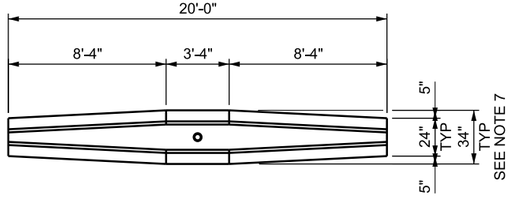
TL-3 SHOWN; TL-5 SIMILAR

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
P1	#8	20	PAVEMENT TO BARRIER (VERTICAL)	TL-3: 12" OPTION 1; 12", 3" OPTION 2 — TL-5: 24" OPTION 1; 24", 3" OPTION 2
H1	#5	8 (TL-3) 12 (TL-5)	HORIZONTAL IN BARRIER TIED TO INSIDE OF V1 BARS	8'-2 1/2", 3'-4", 8'-2 1/2", 5"
V1	#5	26	VERTICAL IN BARRIER	OPTION 1; OPTION 2

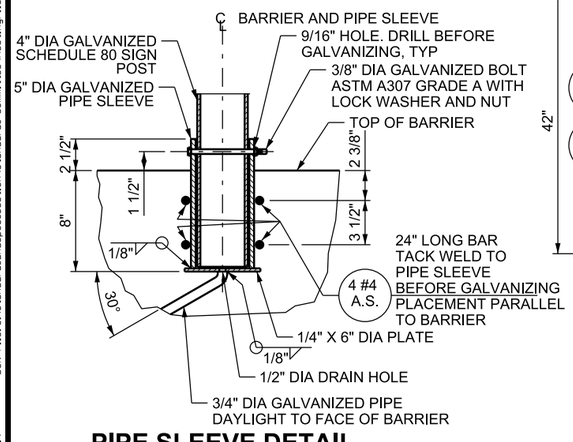
W	QTY
6"	2
6 1/2"	4
7"	2
7 1/2"	2
8 1/2"	2
9"	2
9 1/2"	2
10"	2
11 1/2"	2
12 1/2"	2
14 1/2"	2
15 1/2"	2



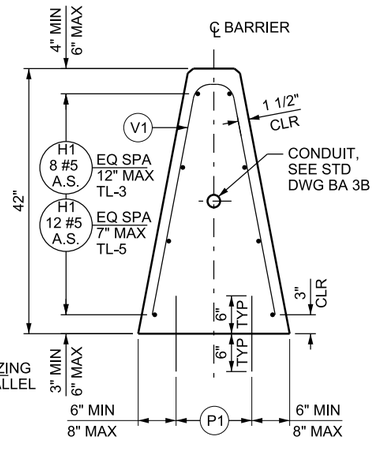
OPTION 1 OPTION 2



PLAN

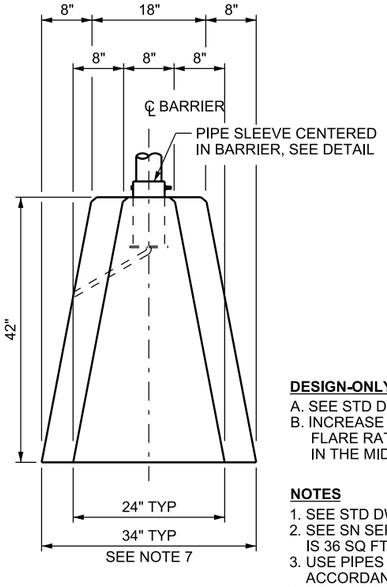


PIPE SLEEVE DETAIL



SECTION B-B

TL-3 SHOWN; TL-5 SIMILAR



VIEW A-A

DESIGN-ONLY NOTES

A. SEE STD DWG BA 1B THROUGH BA 1D FOR TYPICAL LAYOUT REQUIREMENTS.
B. INCREASE LENGTH OF WIDTH TAPER AS NECESSARY WHEN DESIGN PLANS SPECIFY ALTERNATIVE FLARE RATE. ADJUST REINFORCEMENT LENGTHS AS NECESSARY. ADD P1 AND V1 BARS IN THE MIDDLE OF THE BARRIER TO MAINTAIN MAXIMUM SPACING.

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE SN SERIES STD DWG FOR SIGN MOUNTING, HARDWARE, AND PLACEMENT REQUIREMENTS. MAXIMUM SIGN PANEL AREA IS 36 SQ FT.
3. USE PIPES CONFORMING TO ASTM A 53 GRADE B, ASTM A 500 GRADE B, OR ASTM API 5L GRADE B/X42. GALVANIZE IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION IS COMPLETED.
4. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
5. USE H1 AND P1 BARS CONSISTENT WITH THE TEST LEVEL RATING OF ADJACENT BARRIER.
6. TYPICAL SECTION SHOWN. VARY WIDTH AS SHOWN IF MEDIAN BARRIER IS STEPPED. REFER TO STD DWG BA 3A1 OR BA 3E2 AND ADJUST V4 BARS SIMILAR TO V1 BAR ADJUSTMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

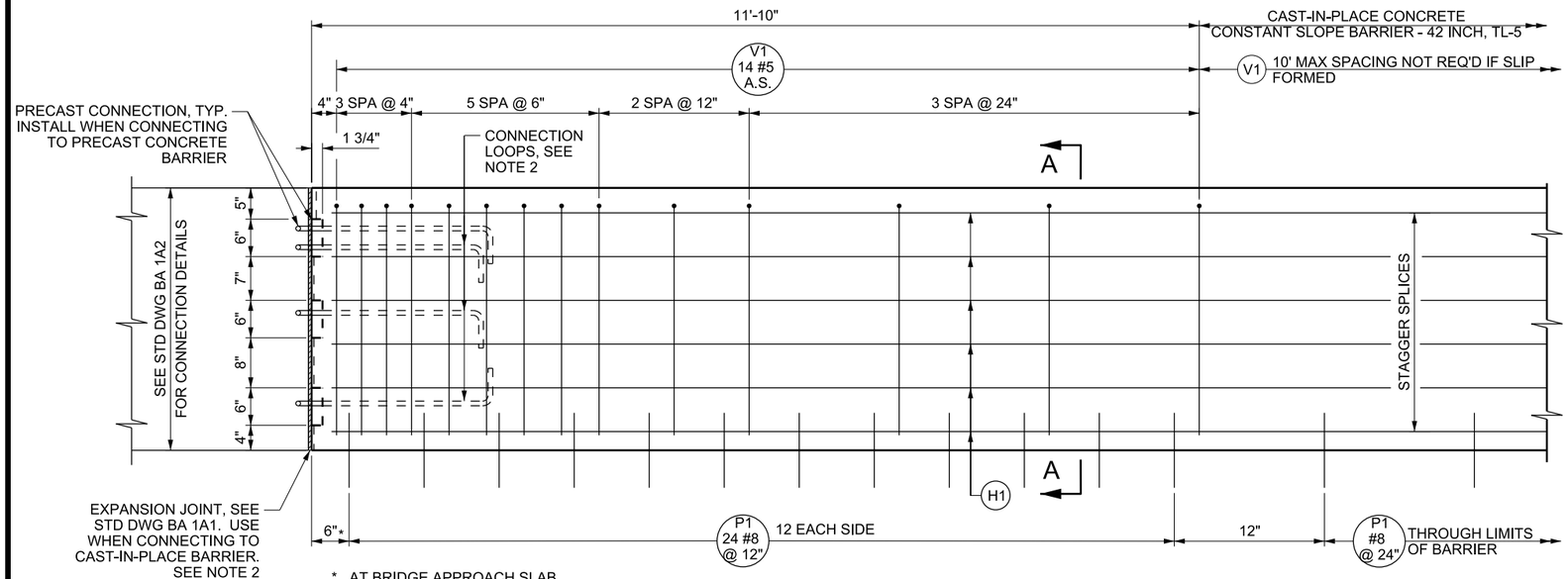
RECOMMENDED FOR APPROVAL	JAN.01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	JAN.01, 2017 DATE
DEPUTY DIRECTOR	

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, MEDIAN SMALL SIGN SECTION

STANDARD DRAWING TITLE

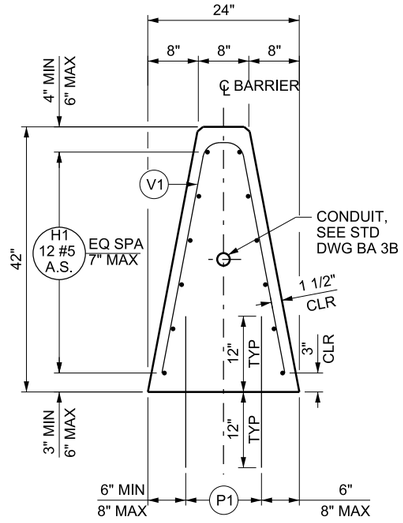
STD. DWG. NO.

BA 3D

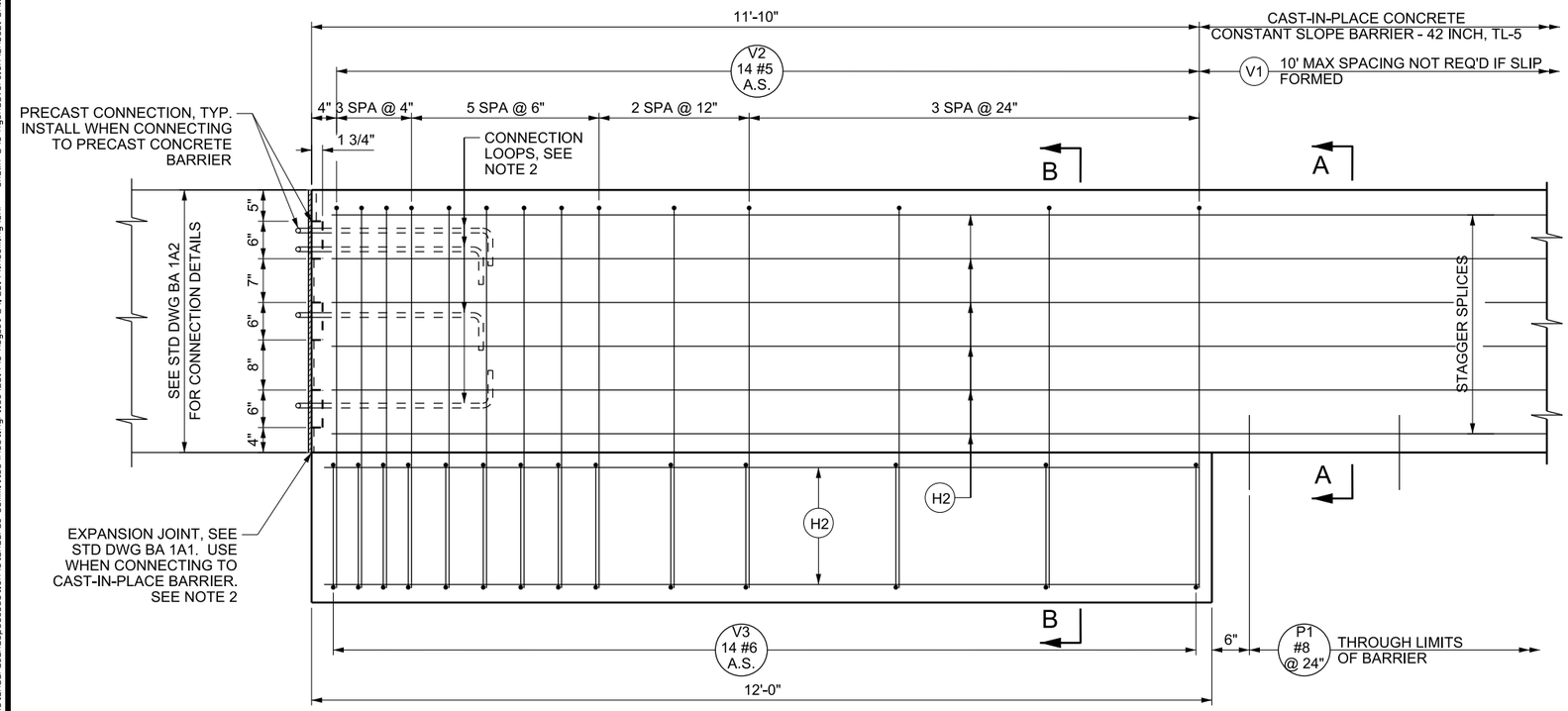


* AT BRIDGE APPROACH SLAB, PLACE P1 BAR 2" FROM EDGE OF PCCP

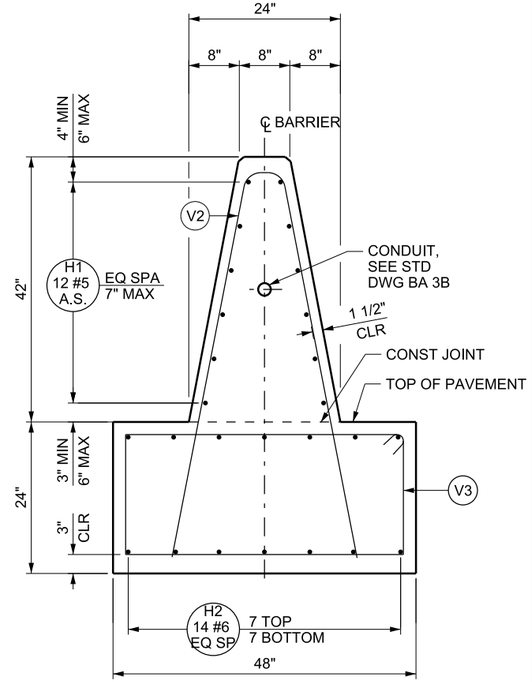
ELEVATION
BARRIER ON PCCP



SECTION A-A



ELEVATION
BARRIER ON HMA



SECTION B-B

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE STD DWG BA 3E2 FOR STEPPED MEDIAN DETAILS AND REINFORCING STEEL SCHEDULE.
4. SEE STD DWG BA 3A2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

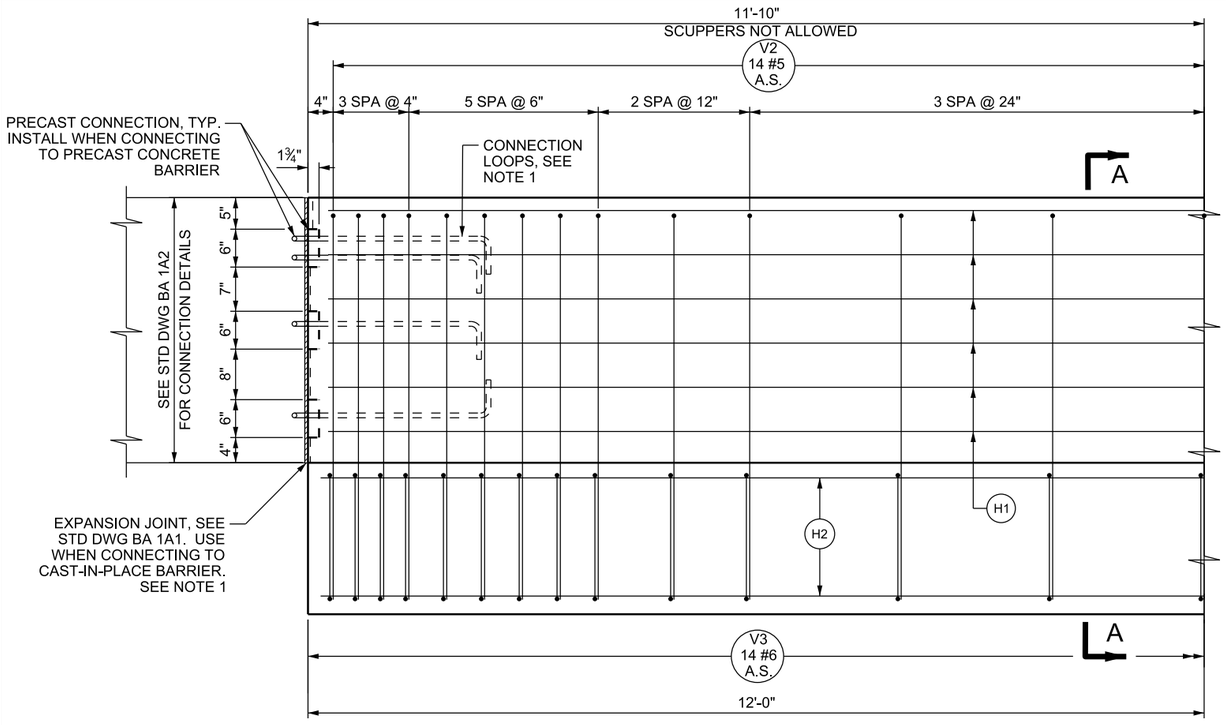
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-5
1 OF 2

STANDARD DRAWING TITLE

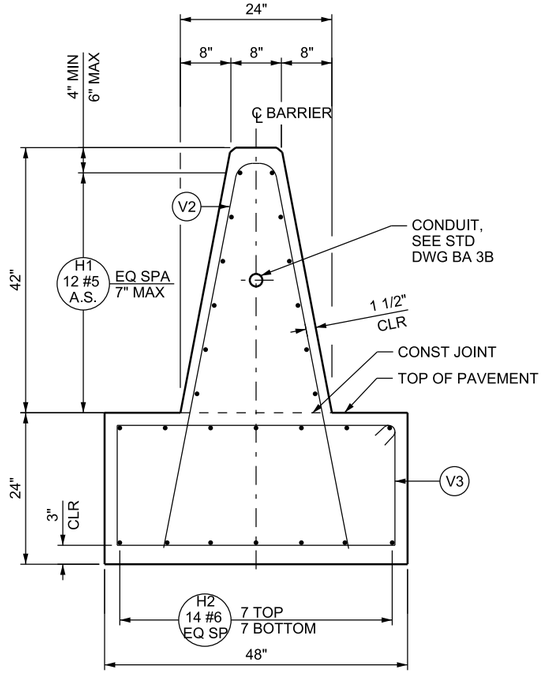
STD. DWG. NO.
BA 3E1

DGN File: D:\Standardsandspecssection\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA03E1 DM.dgn
08-AUG-2019

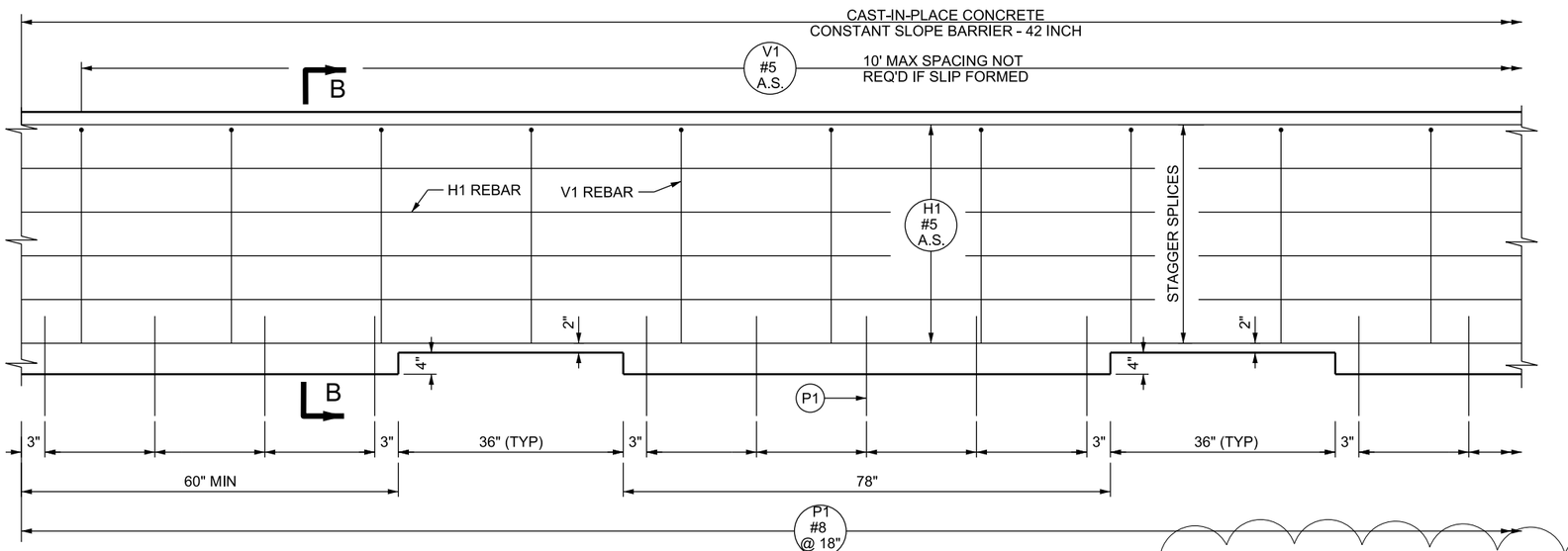


ELEVATION

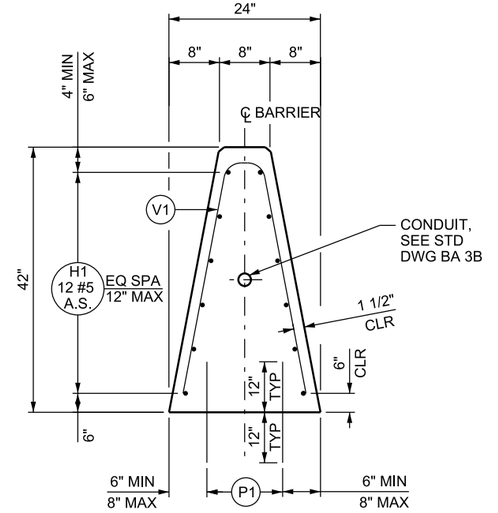
BARRIER ON HMA SHOWN
SEE BA 3E1 FOR BARRIER ON PCCP



SECTION A-A



ELEVATION



SECTION B-B

NOTES:

1. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
3. SEE STD DWG BA 3E2 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3A2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
6. SEE STD DWG BA 1A1 FOR GENERAL NOTES.

SUPPLEMENTAL DRAWING

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

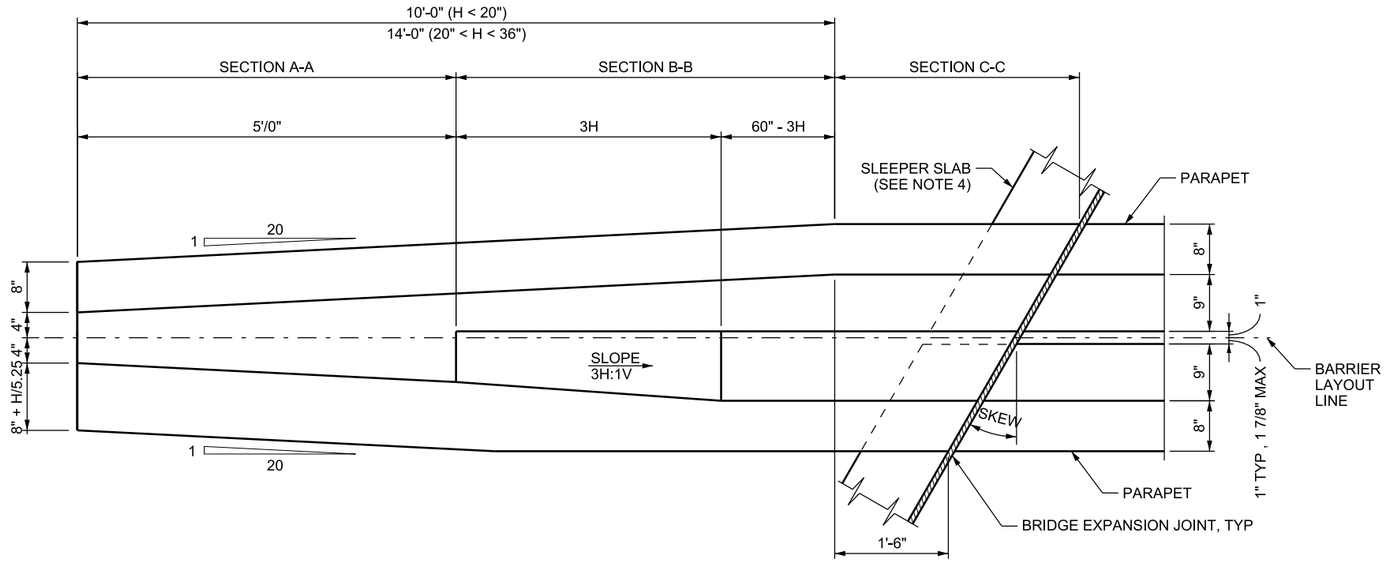
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER WITH SCUPPERS - 42 INCH, TL-5

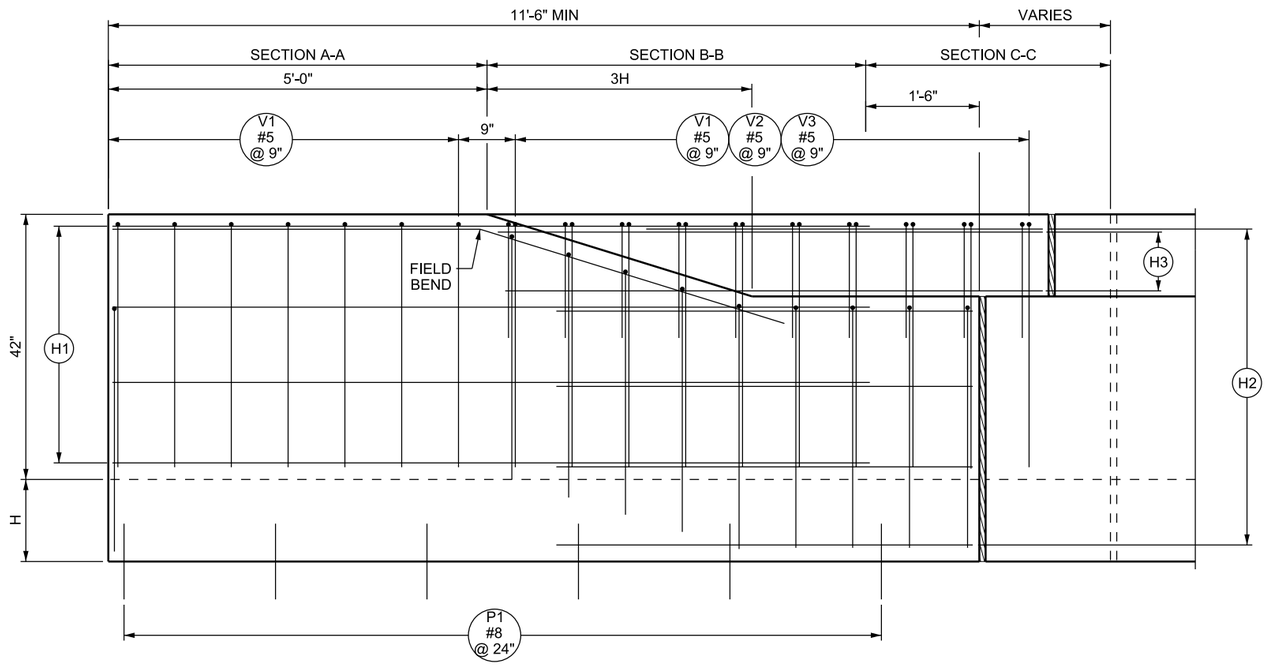
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3E3

DGN Files:D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2019\15-August 29, 2019\Incoming\SAF - Shawn D\3-Agenda\Version\BA03E3 DM.dgn
08-AUG-2019



PLAN - SKEW < 30°



ELEVATION - SKEW < 30°

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3F3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.
3. SLEEPER SLAB ENDS AT FACE OF PARAPET FOR H GREATER THAN 14 INCHES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTE TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

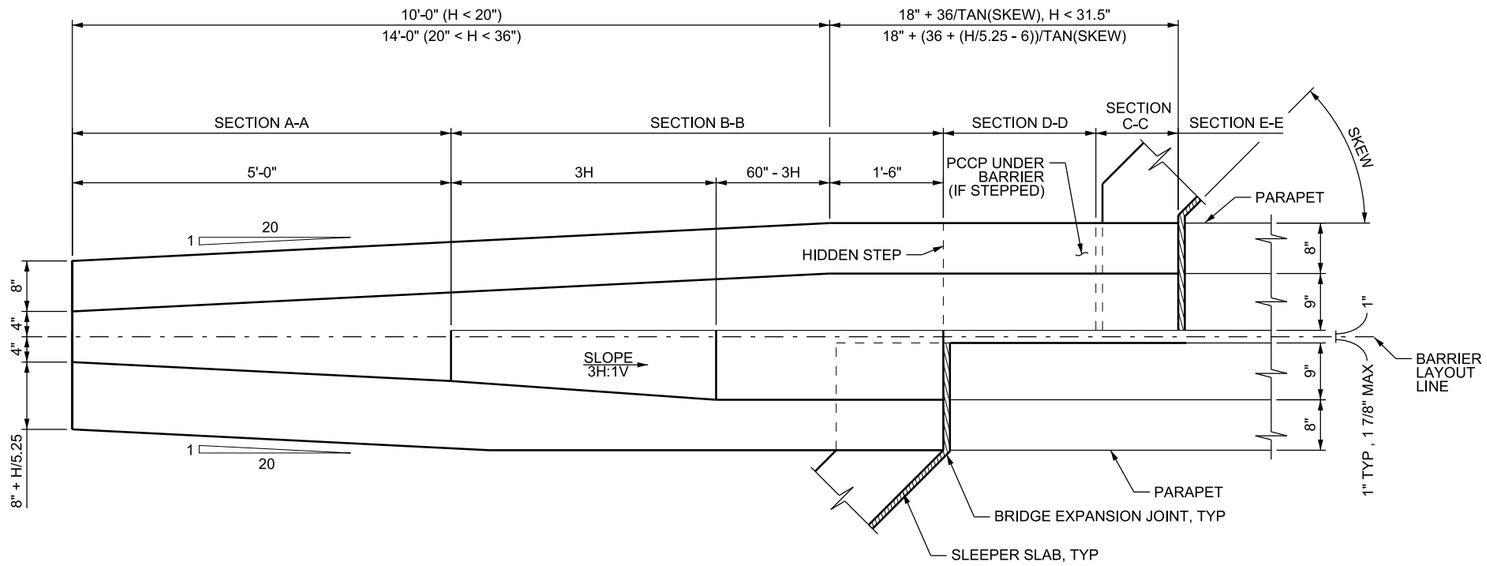
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, BRIDGE PARAPET TRANSITION 1 OF 3

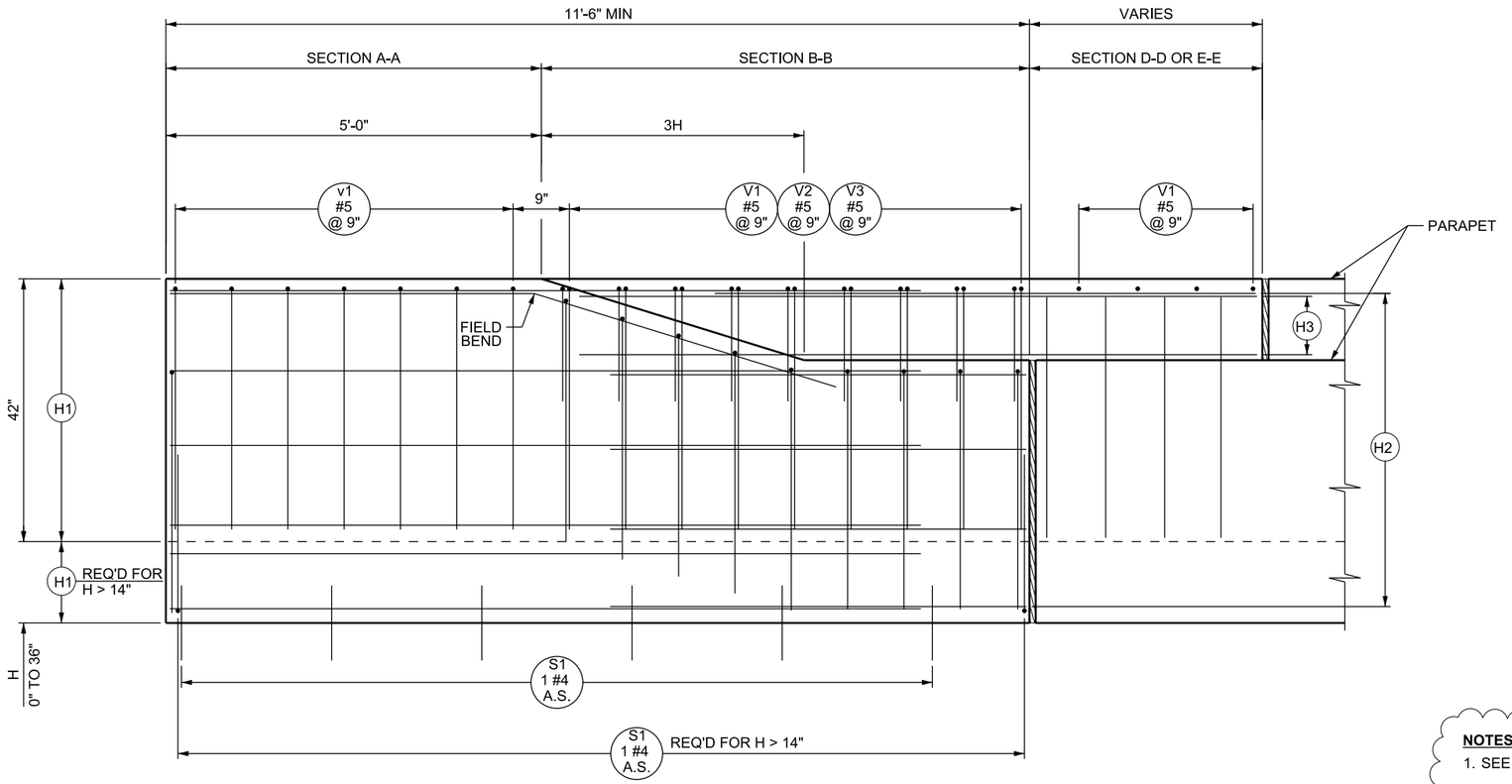
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3F1



PLAN - H < 36 INCH, 30° < SKEW < 45°



ELEVATION - H < 36 INCH, 30° < SKEW < 45°

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3F3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTE TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

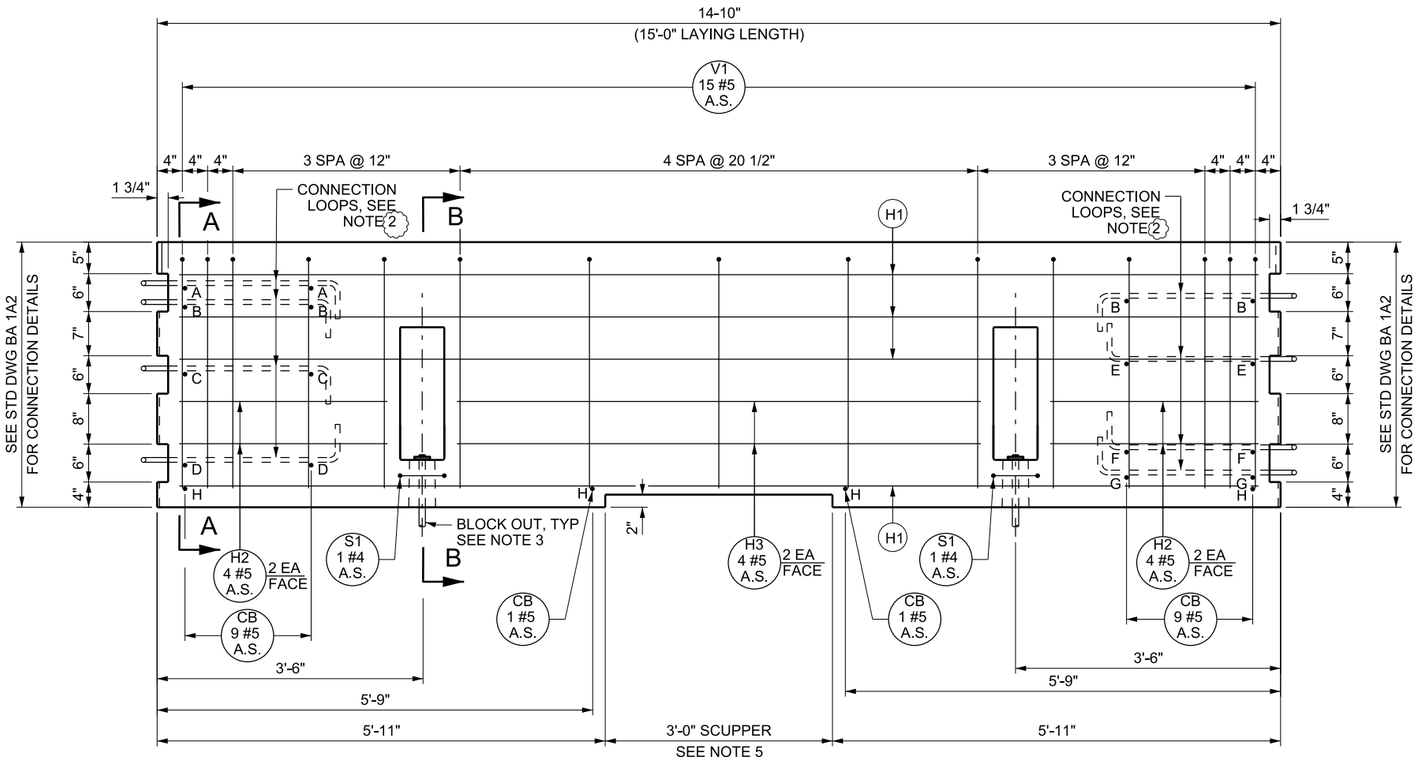
DEPUTY DIRECTOR — DATE

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, BRIDGE PARAPET TRANSITION 2 OF 3

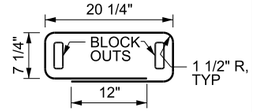
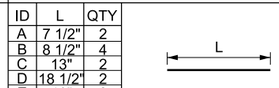
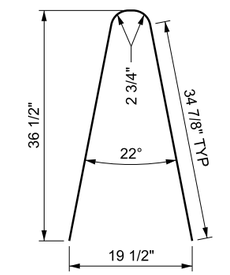
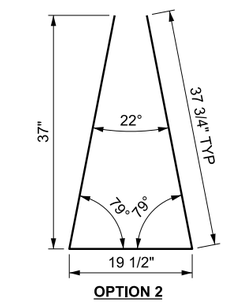
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3F2



ELEVATION

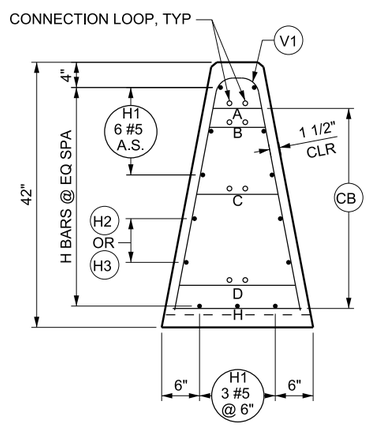
BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	9	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-3"
H2	#5	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	2'-9"
H3	#5	4	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	7'-0"
S1	#4	2	HORIZONTAL AROUND BARRIER STABILIZATION SLOTS TOTAL LENGTH = 5'-7"	
CB	#4	20	CROSS BARS (CB) TIED TO V1 BARS	
V1	#5	15	VERTICAL IN BARRIER TOTAL LENGTH: OPTION 1 = 6'-10 1/2" OPTION 2 = 7'-11"	 

ID	L	QTY
A	7 1/2"	2
B	8 1/2"	4
C	13"	2
D	18 1/2"	2
E	12"	2
F	17 1/2"	2
G	19"	2
H*	19 1/2"	4

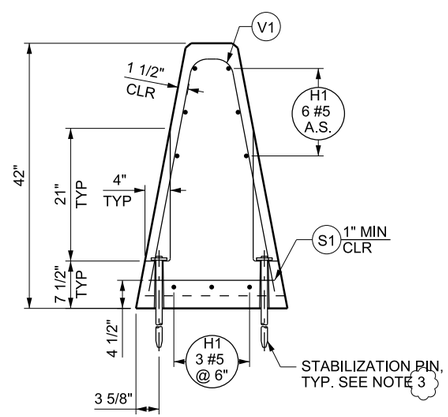
* NOT REQUIRED WITH V1 OPTION 2 BARS

OPTION 1

OPTION 2



SECTION A-A



SECTION B-B

NOTES:

1. SEE STD DWG BA 1A1 AND BA 1A2 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN" ON STD DWG BA 1A2 FOR DETAILS.
4. PROVIDE SCUPPERS WHEN NOTED ON PLANS. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
6. EACH BARRIER UNIT WEIGHS 5.2 TONS.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

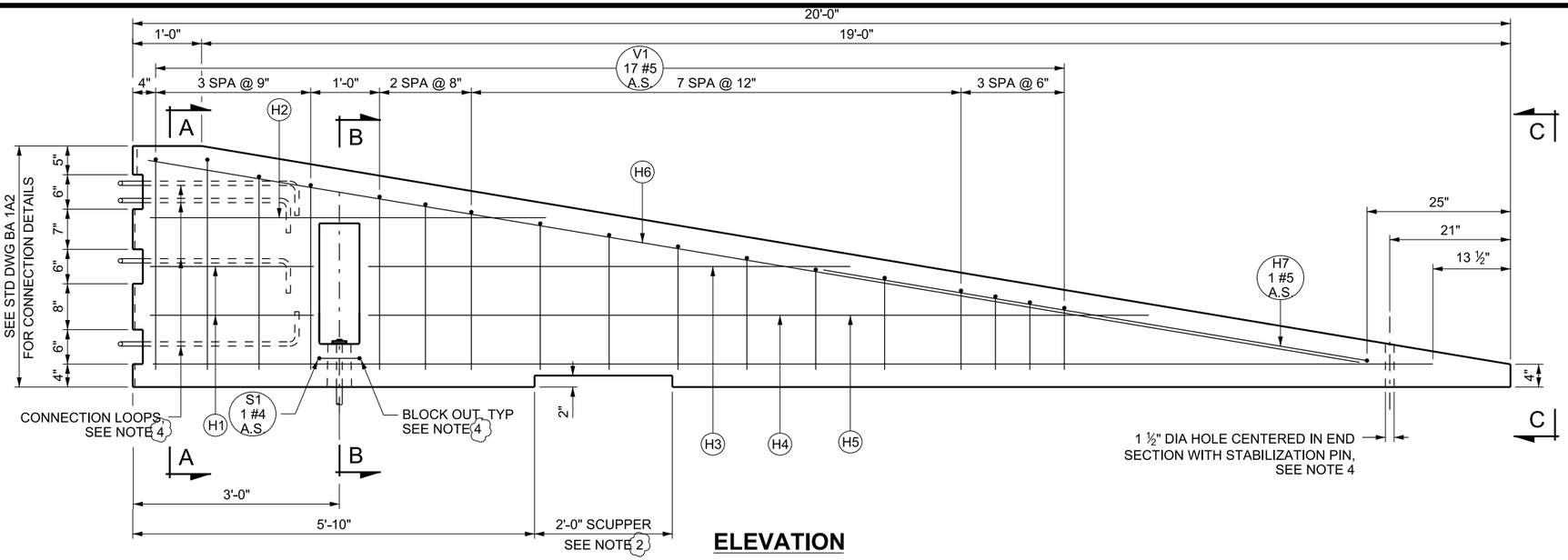
	DATE
RECOMMENDED FOR APPROVAL	AUG. 29, 2019
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG. 29, 2019
DEPUTY DIRECTOR	DATE

PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH

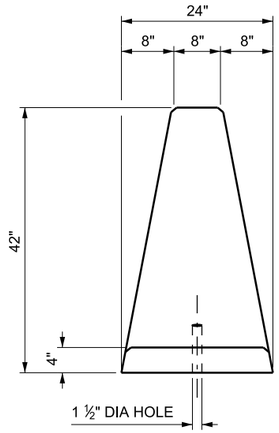
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3G



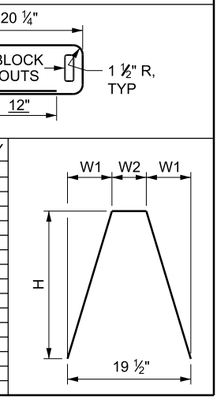
ELEVATION

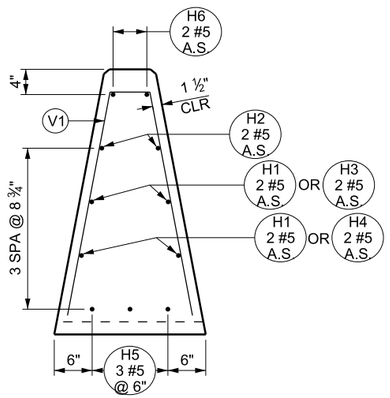


VIEW C-C

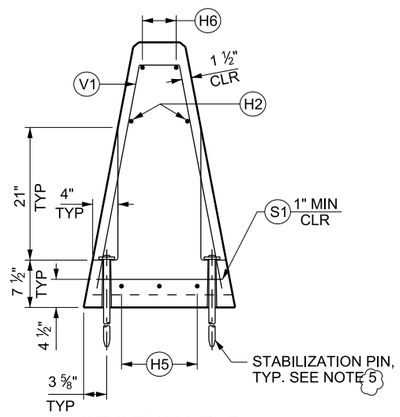
BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	4	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	2'-4"
H2	#5	2	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	5'-9"
H3	#5	2	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	7'-0"
H4	#5	2	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	11'-4"
H5	#5	3	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	18'-7"
H6	#5	2	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	17'-10"
H7	#5	1	HORIZONTAL IN BARRIER ALONG TOP SLOPE TOTAL LENGTH = 17'-7 1/2"	8'-0" TYP, 19 ½"
S1	#4	1	HORIZONTAL AROUND BARRIER STABILIZATION SLOTS TOTAL LENGTH = 5'-7"	20 ¼", 7 ¼", BLOCK OUTS, 1 ½" R, TYP, 12"
V1	#5	17	VERTICAL IN BARRIER	

H	W1	W2	QTY
37"	7"	5 ½"	2
35 ½"	6 ½"	6 ½"	1
34"	6 ½"	6 ½"	1
32 ½"	6"	7 ½"	1
30 ½"	5 ½"	8 ½"	1
29"	5 ½"	8 ½"	1
27"	5"	9 ½"	1
25"	4 ½"	10 ½"	1
23"	4"	11 ½"	1
21"	4"	11 ½"	1
19"	3 ½"	12 ½"	1
17"	3"	13 ½"	1
15"	2 ½"	14 ½"	1
14"	2 ½"	14 ½"	1
13"	2"	15 ½"	1
12"	2"	15 ½"	1





SECTION A-A



SECTION B-B

NOTES:

1. SEE STD DWG BA 1A1 AND BA 1A2 FOR GENERAL NOTES.
2. PROVIDE SCUPPERS WHEN NOTED ON PLANS. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
3. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
4. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN" ON STD DWG BA 1A2 FOR DETAILS. XX
5. INSTALL STABILIZATION PINS IN ALL APPLICATIONS.
6. EACH BARRIER UNIT WEIGHS 4.0 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

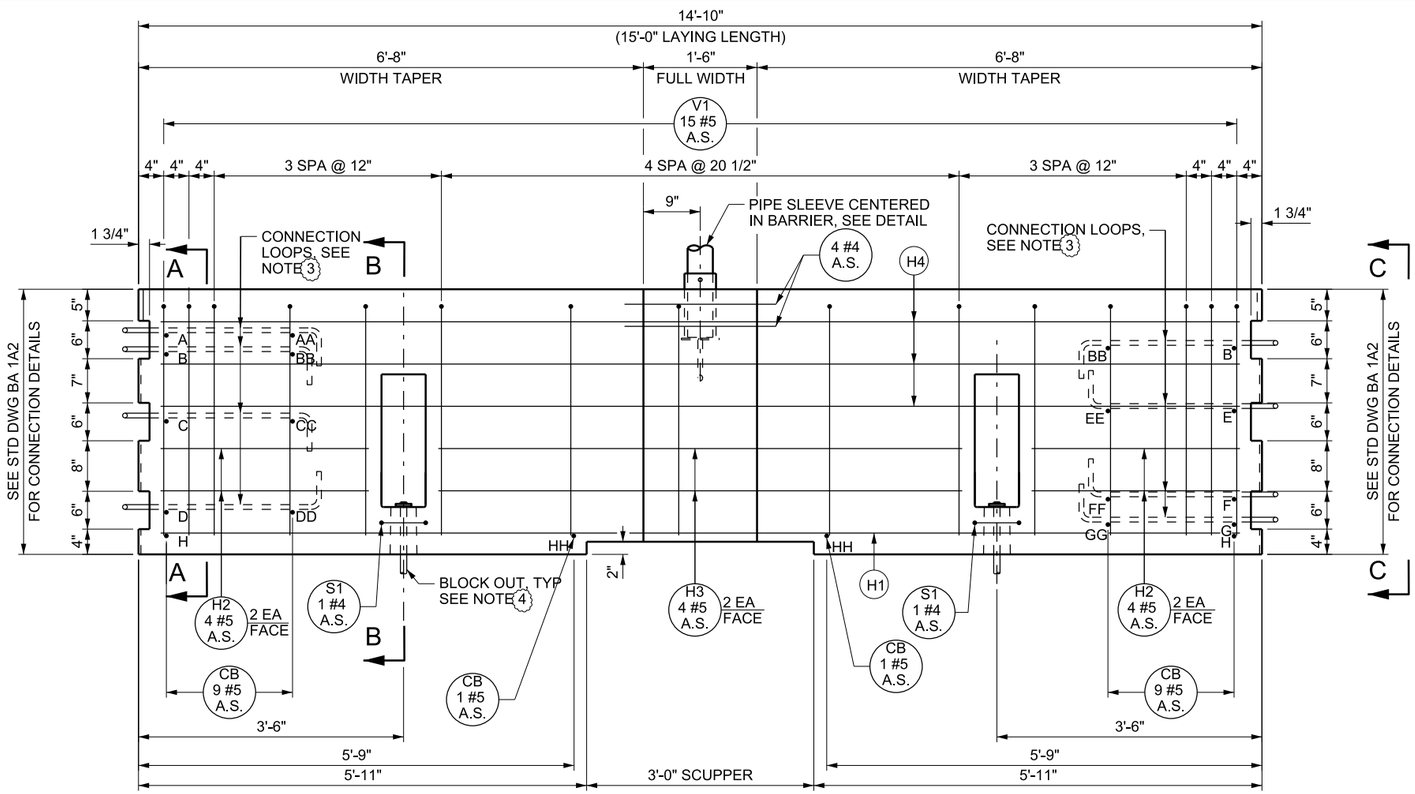
DEPUTY DIRECTOR — DATE

PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, SLOPED END SECTION (FOR SPEEDS ≤ 40 MPH)

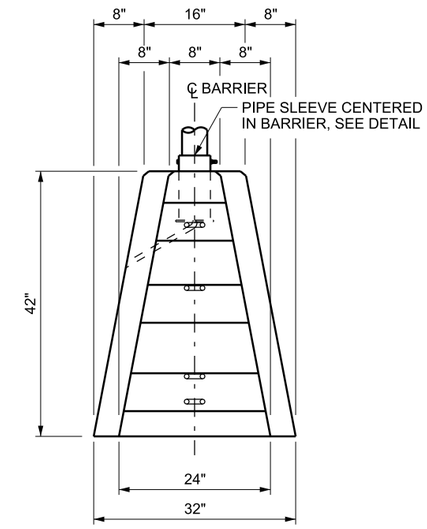
STANDARD DRAWING TITLE

STD. DWG. NO.

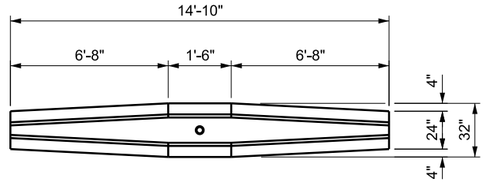
BA 3H



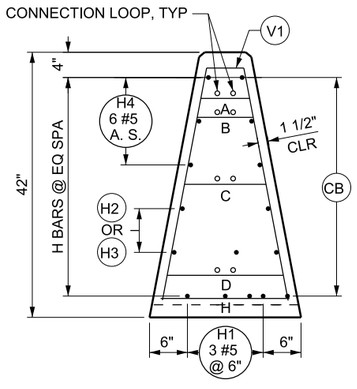
ELEVATION



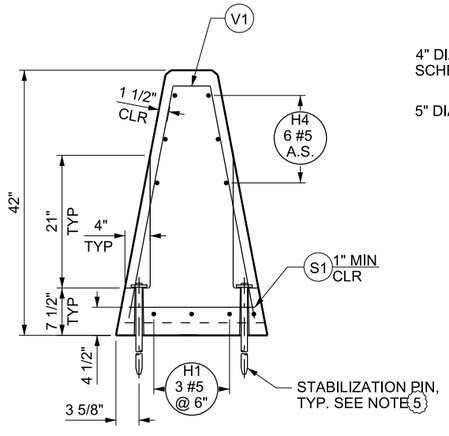
VIEW C-C



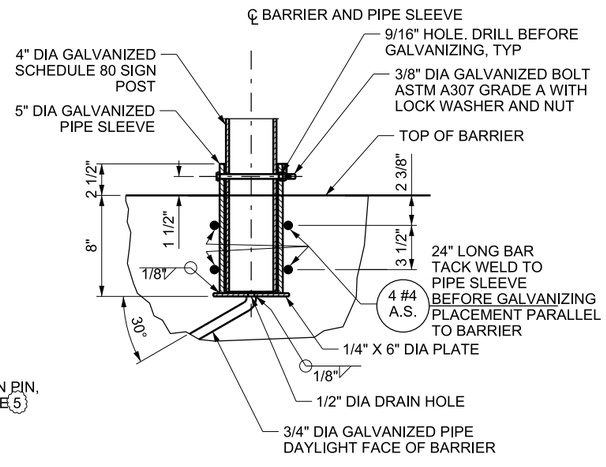
PLAN



SECTION A-A



SECTION B-B



PIPE SLEEVE DETAIL

NOTES:

1. SEE STD DWG BA 1A1 AND BA 1A2 FOR GENERAL NOTES.
2. SEE DESIGN PLAN SET WHEN BARRIER SECTIONS WITH SCUPPERS ARE REQUIRED. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
3. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
4. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN" ON STD DWG BA 1A2 FOR DETAILS.
5. SEE SN SERIES STD DWG FOR SIGN MOUNTING, HARDWARE, AND PLACEMENT REQUIREMENTS. MAXIMUM SIGN PANEL AREA IS 36 SQ FT.
6. USE PIPES CONFORMING TO ASTM A 53 GRADE B, ASTM A 500 GRADE B, OR ASTM API 5L GRADE B/X42. GALVANIZE IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION IS COMPLETED.
7. SEE STD DWG BA 3I2 FOR REINFORCING STEEL SCHEDULE.
8. EACH BARRIER UNIT WEIGHS 6.6 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG.29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG.29, 2019 — DATE

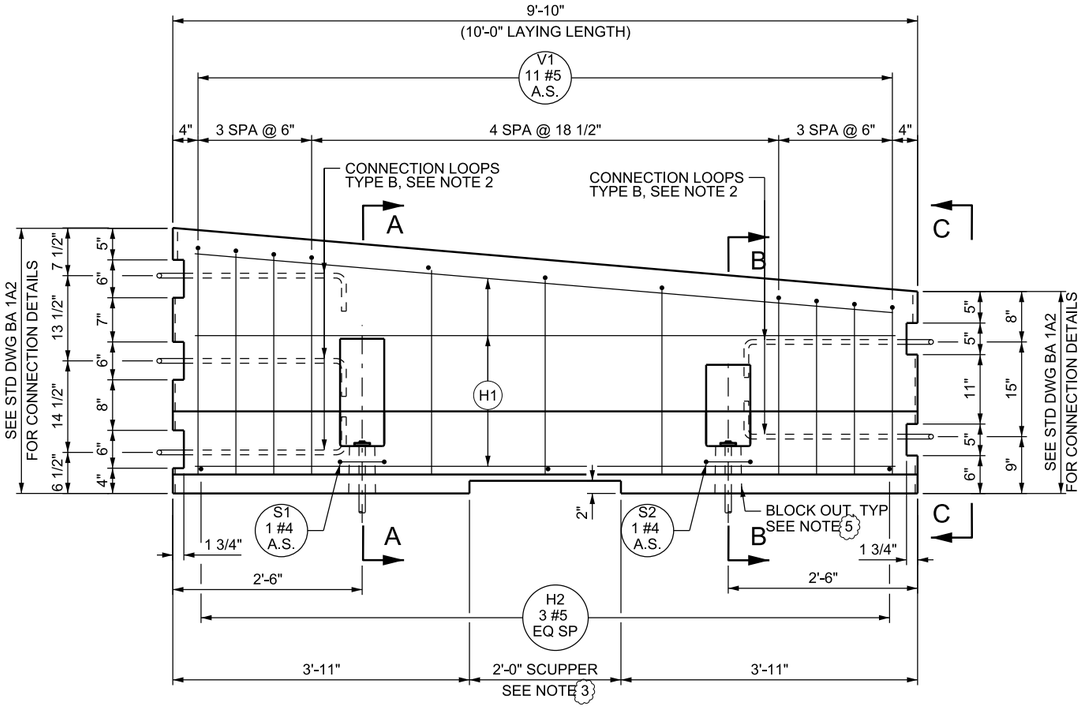
DEPUTY DIRECTOR

PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, MEDIAN SMALL SIGN SECTION 1 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.

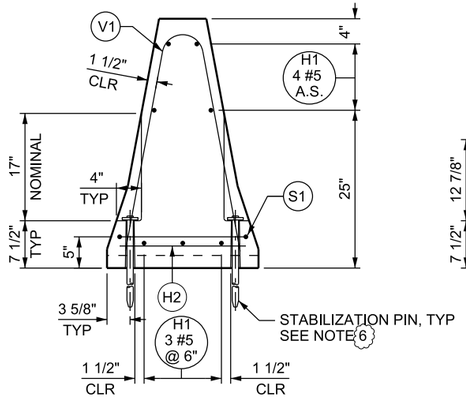
BA 3I1



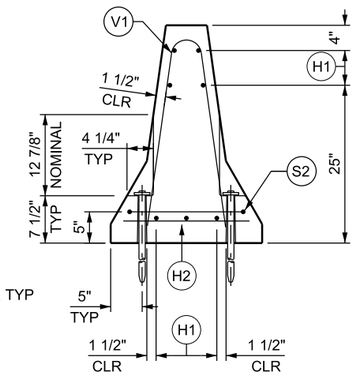
ELEVATION

BAR MARK	BAR SIZE	NO. BARS	SKETCH	LOCATION
H1	#5	7	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	9'-3"
H2	#5	3	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	1'-7"
S1	#4	1	HORIZONTAL AROUND BARRIER STABILIZATION SLOTS TOTAL LENGTH = 5'-7"	20 1/4"; 7 1/4"; BLOCK OUTS; 1 1/2" R, TYP; 12"
S2	#4	1	HORIZONTAL AROUND BARRIER STABILIZATION SLOTS TOTAL LENGTH = 5'-3"	18 1/4"; 7 1/4"; BLOCK OUTS; 1 1/2" R, TYP; 12"
V1	#5	11	VERTICAL IN BARRIER	

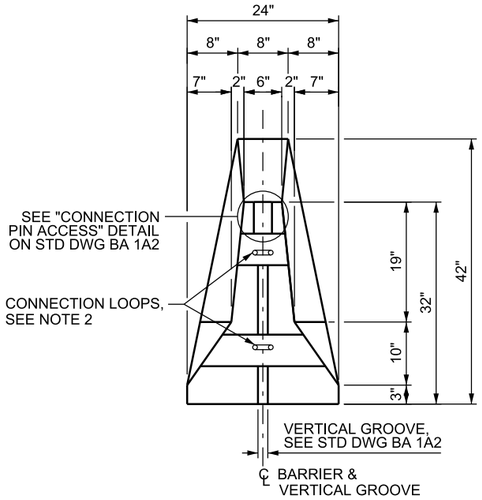
H	W	QTY
36 1/2"	19"	1
36"	18 1/2"	1
35 1/2"	18"	1
35"	17 1/2"	1
33 1/2"	16"	1
32"	14"	1
30 1/2"	12 1/2"	1
29"	11"	1
28 1/2"	10 1/2"	1
28"	10"	1
27 1/2"	9 1/2"	1



SECTION A-A



SECTION B-B



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. PROVIDE SCUPPERS WHEN NOTED ON PLANS. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
4. USE THIS TRANSITION SECTION WHEN A CRASH CUSHION OR W-BEAM GUARDRAIL TRANSITION IS REQUIRED ON PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH
5. SEE "BARRIER BLOCK OUT AND STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
6. USE THIS TRANSITION SECTION WHEN A CRASH CUSHION OR W-BEAM GUARDRAIL TRANSITION IS REQUIRED ON A CONSTANT SLOPE BRIDGE PARAPET OR PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH.
7. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
8. EACH BARRIER UNIT WEIGHS 2.7 TONS.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR — DATE

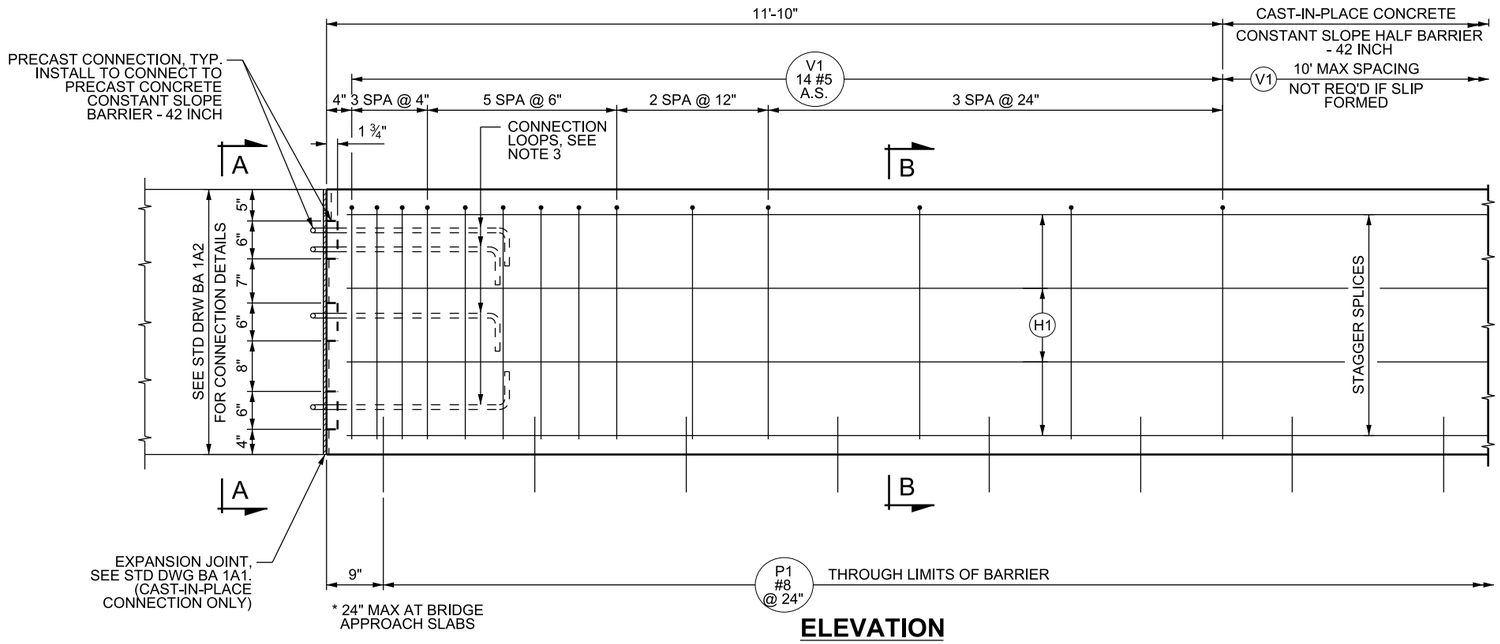
PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, 32 INCH NEW JERSEY SHAPE TRANSITION

STANDARD DRAWING TITLE

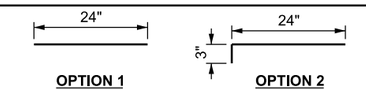
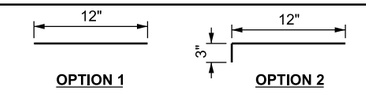
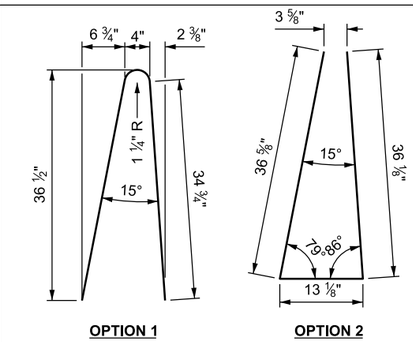
STD. DWG. NO.

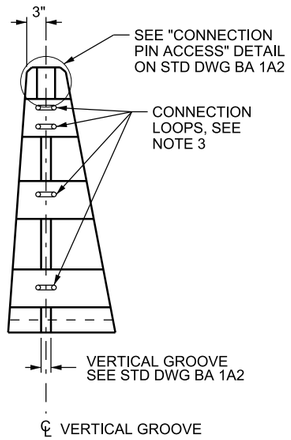
BA 3J

08-AUG-2019 DGN File: D:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA03J DM.dgn

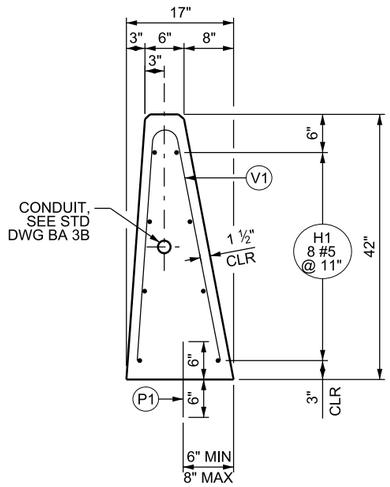


ELEVATION

BAR MARK	BAR SIZE	LOCATION	SKETCH
P1	#8	(BARRIER WITH SCUPPERS) PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
P1	#8	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
H1	#5	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS CONTINUOUS THROUGH LENGTH OF BARRIER	
V1	#5	VERTICAL IN BARRIER TOTAL LENGTH: OPTION 1 = 6'-4" OPTION 2 = 7'-1 7/8"	



VIEW A-A
PRECAST CONNECTION ONLY



SECTION B-B

NOTES:
1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

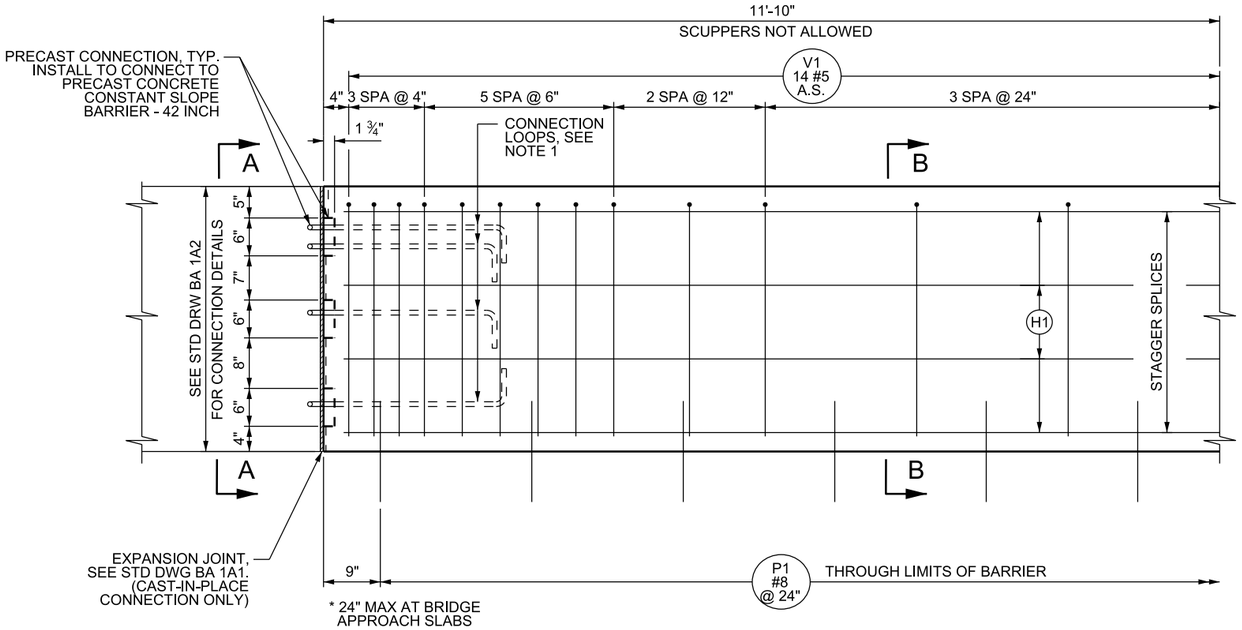
RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN. 01, 2017 — DATE
DEPUTY DIRECTOR — DATE

CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH

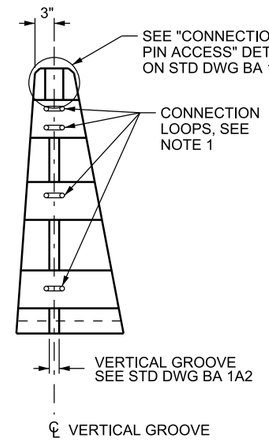
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3K1

DGN File: D:\StandardsAndSpecsSection\Standards Committee\MeetingFiles\2019\15-August 29, 2019\Incoming\SAF - Shawn D\3-Agenda\Version\BA03K1 DM.dgn
08-AUG-2019

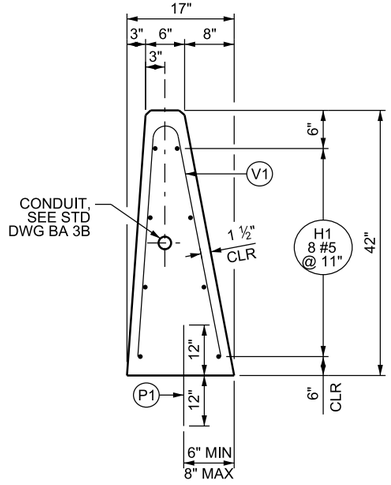


ELEVATION

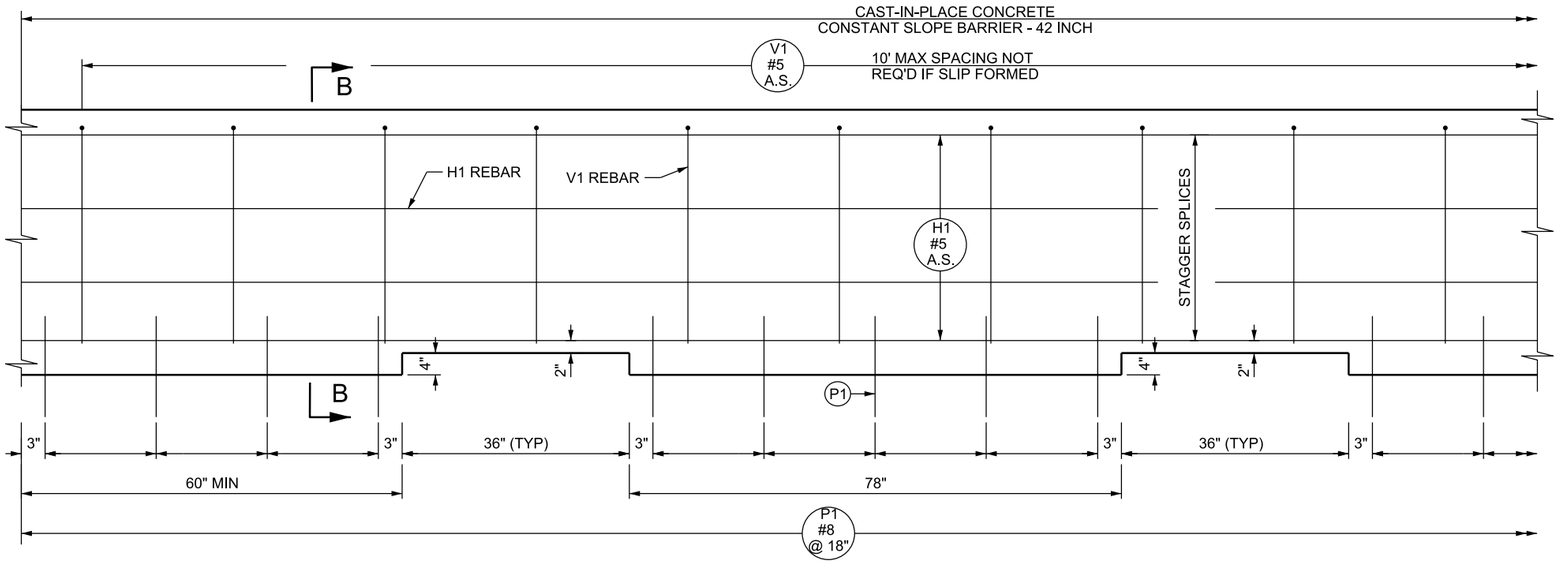


VIEW A-A

PRECAST CONNECTION ONLY



SECTION B-B



ELEVATION

NOTES:

1. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
3. SEE STD DWG BA 3K1 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3A2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
6. SEE STD DWG BA 1A1 FOR GENERAL NOTES.

SUPPLEMENTAL DRAWING

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

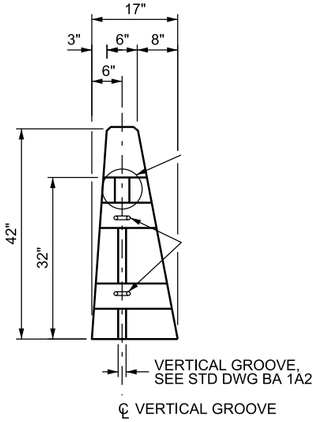
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER WITH SCUPPERS - 42 INCH

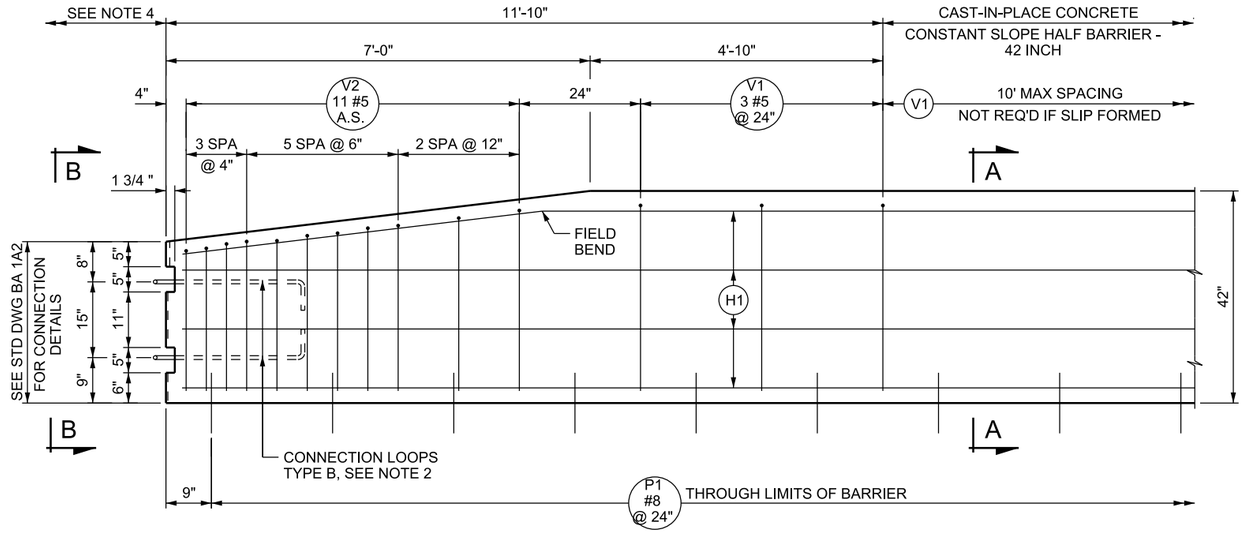
STANDARD DRAWING TITLE

STD. DWG. NO.

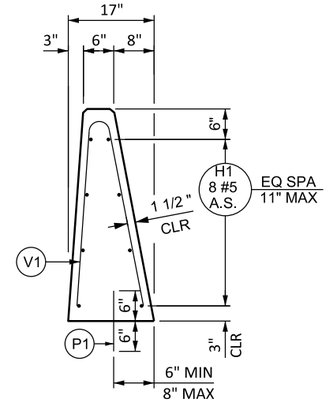
BA 3K2



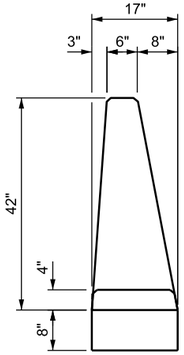
VIEW B-B



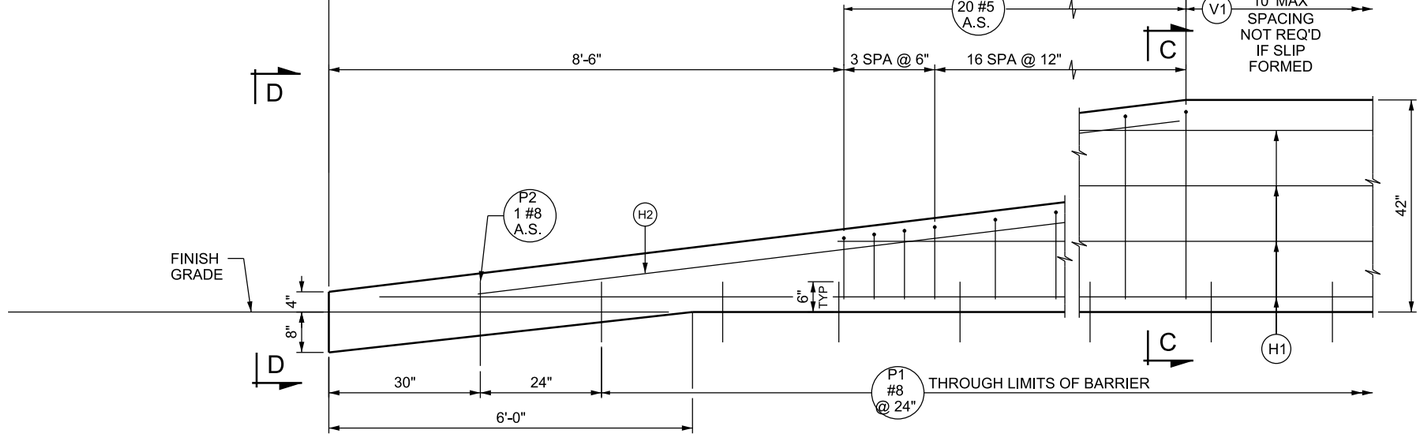
ELEVATION - APPROACH END SECTION



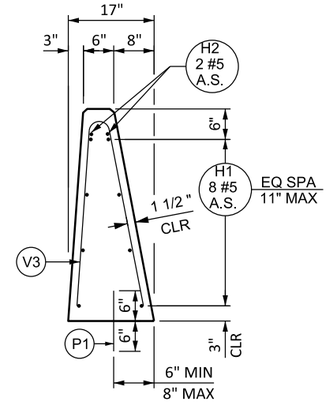
SECTION A - A



VIEW D-D



ELEVATION - TRAILING SLOPED END SECTION



SECTION C - C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE STD DWG BA 3K4 FOR REINFORCING STEEL SCHEDULE AND NOTES.

SUPPLEMENTAL DRAWING

REVISIONS					
NO.	DATE	APPR.	REMARKS		
1	08/29/19	SDD	DELETED DESIGN ONLY NOTES.		

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

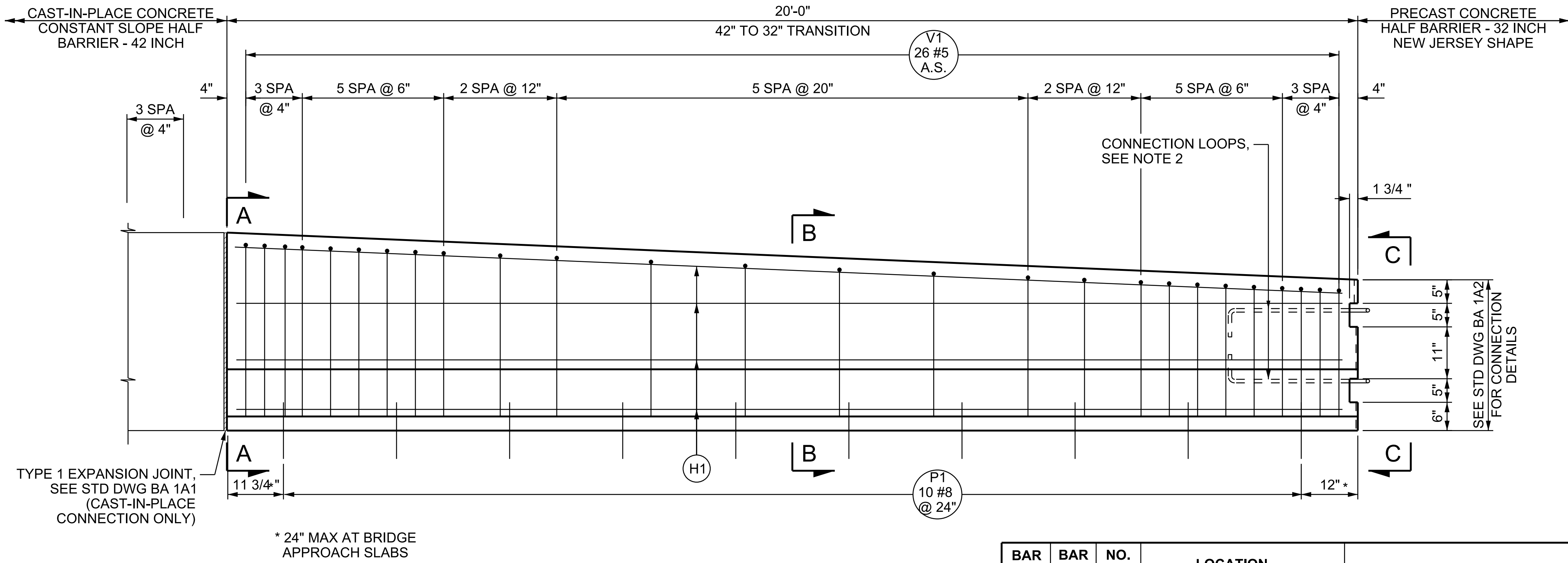
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

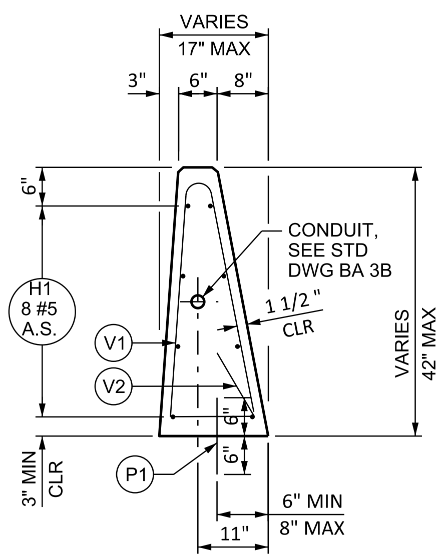
CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH

STANDARD DRAWING TITLE

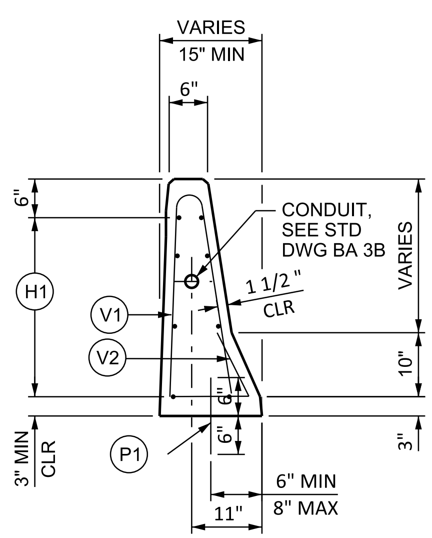
STD. DWG. NO.
BA 3K3



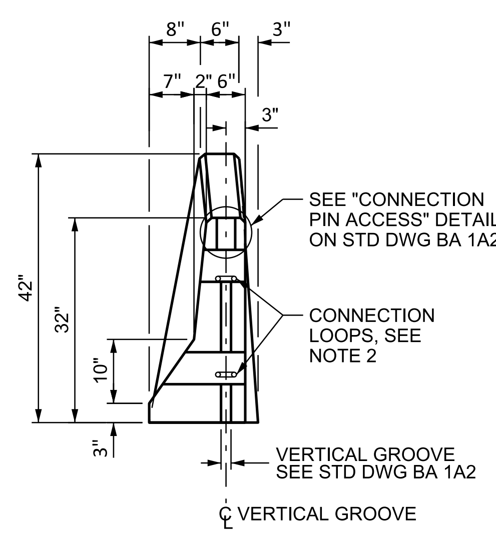
ELEVATION



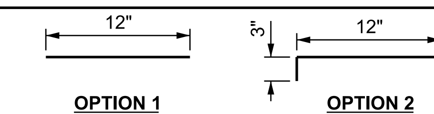
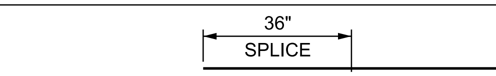
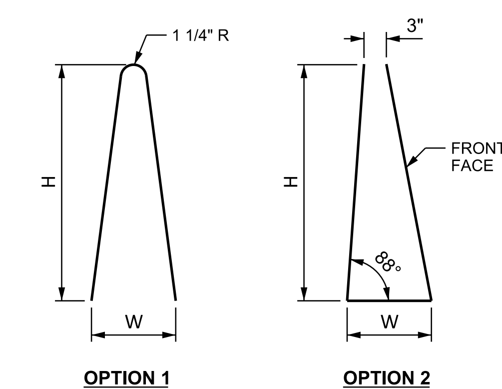
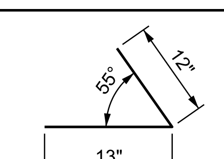
SECTION A-A



SECTION B-B



VIEW C-C

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
P1	#8	10	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
H1	#5	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS CONTINUOUS THROUGH LENGTH OF BARRIER	
V1	#5	26	VERTICAL IN BARRIER	(see table below) 
V2	#5	18	VERTICAL IN BARRIER TIE TO V1 BARS TOTAL LENGTH = 2'-1"	

H	W	QTY
36 1/2"	13"	1
36 1/2"	13"	1
36 1/2"	12 1/2"	1
36"	12 1/2"	1
36"	12 1/2"	1
35 1/2"	12"	1
35 1/2"	12"	1
35"	12"	1
35"	11 1/2"	1
34 1/2"	11 1/2"	1
34"	11"	1
33"	10 1/2"	1
32"	9 1/2"	1
31 1/2"	9"	1
30 1/2"	8 1/2"	1
29 1/2"	8"	1
29"	8"	1
29"	7 1/2"	1
28 1/2"	7"	1
28"	7"	1
28"	7"	1
28"	6 1/2"	1
27 1/2"	6 1/2"	1
27 1/2"	6 1/2"	1
27"	6"	1
27"	6"	1

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS. PLACE THE APPROPRIATE CONNECTION LOOP CONFIGURATION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
4. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS.
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTE TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

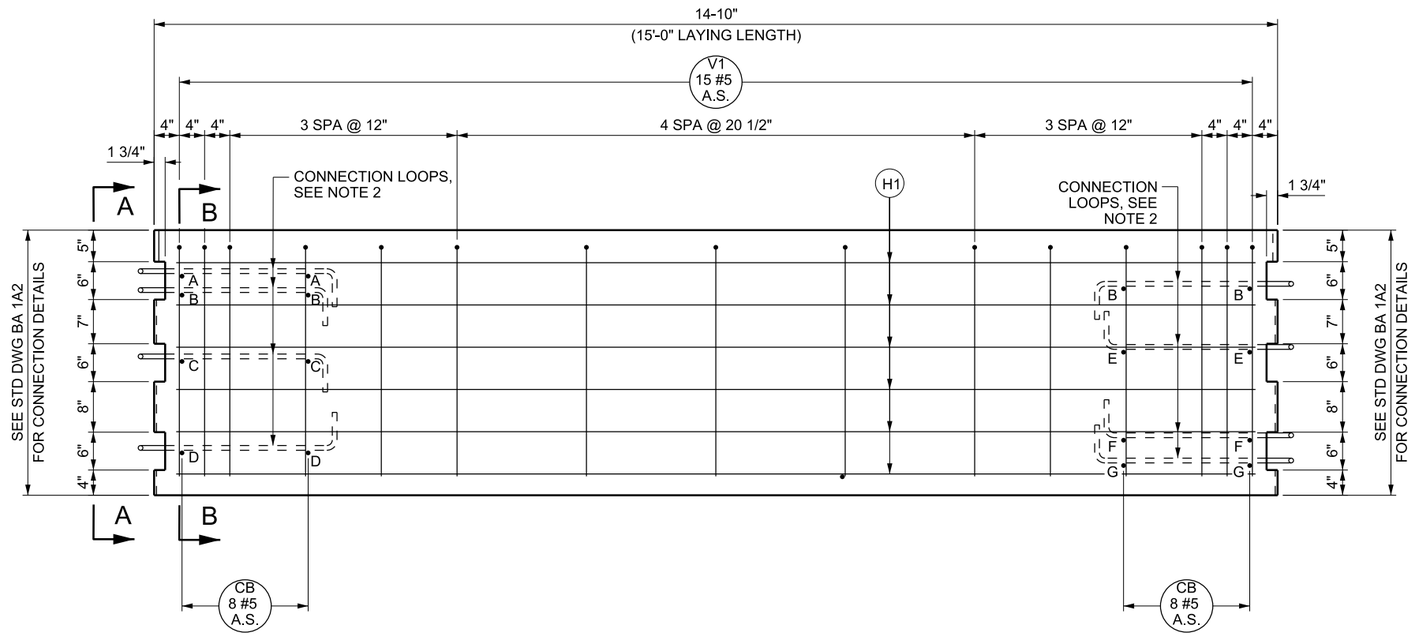
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE HALF BARRIER - 42 INCH CONSTANT SLOPE, 32 INCH NEW JERSEY SHAPE BARRIER TRANSITION

STANDARD DRAWING TITLE

STD. DWG. NO.

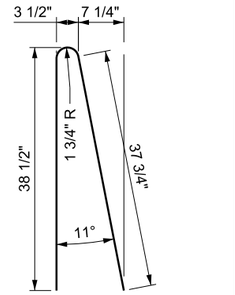
BA 3K5



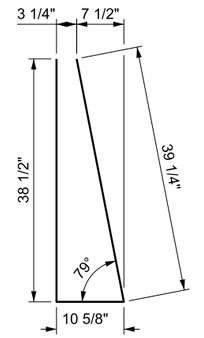
ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	12	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-3"
CB	#4	16	CROSS BARS (CB) TIED TO V1 BARS	L
V1	#5	15	VERTICAL IN BARRIER	OPTION 1 / OPTION 2

ID	L	QTY
A	4 1/2"	2
B	5"	4
C	7"	2
D	10"	2
E	6 1/2"	2
F	9 1/2"	2
G	10"	2

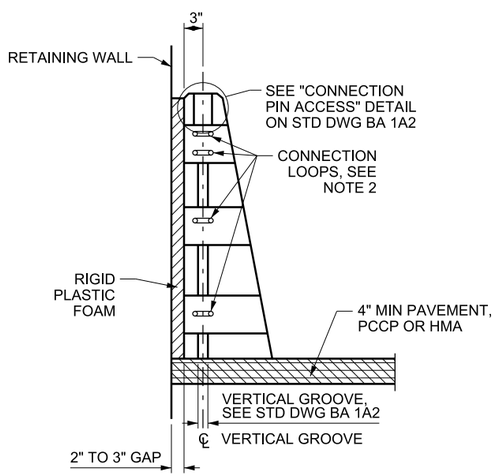


OPTION 1

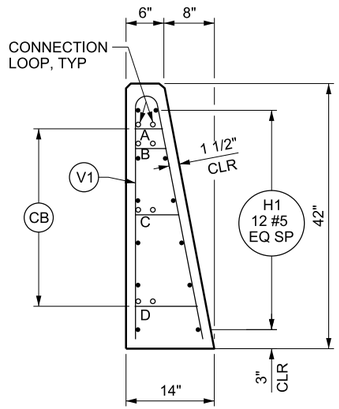


OPTION 2

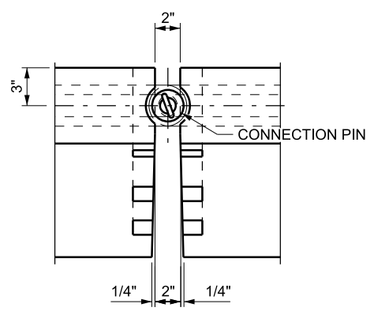
TOTAL LENGTH:
OPTION 1 = 6'-7 5/8"
OPTION 2 = 7'-4 3/8"



VIEW A-A
AT RETAINING WALL



SECTION B-B



PARTIAL PLAN

NOTES:
1. SEE STD DWG BA 1A1 AND BA 1A2 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. DO NOT USE AS RETAINING BARRIER. REFER TO STD DWG BA 1C FOR RETAINING BARRIER APPLICATIONS.
4. USE ONLY IN FRONT OF A RETAINING WALL. DO NOT USE IN A WORK ZONE APPLICATION.
5. EACH BARRIER UNIT WEIGHS 3.2 TONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

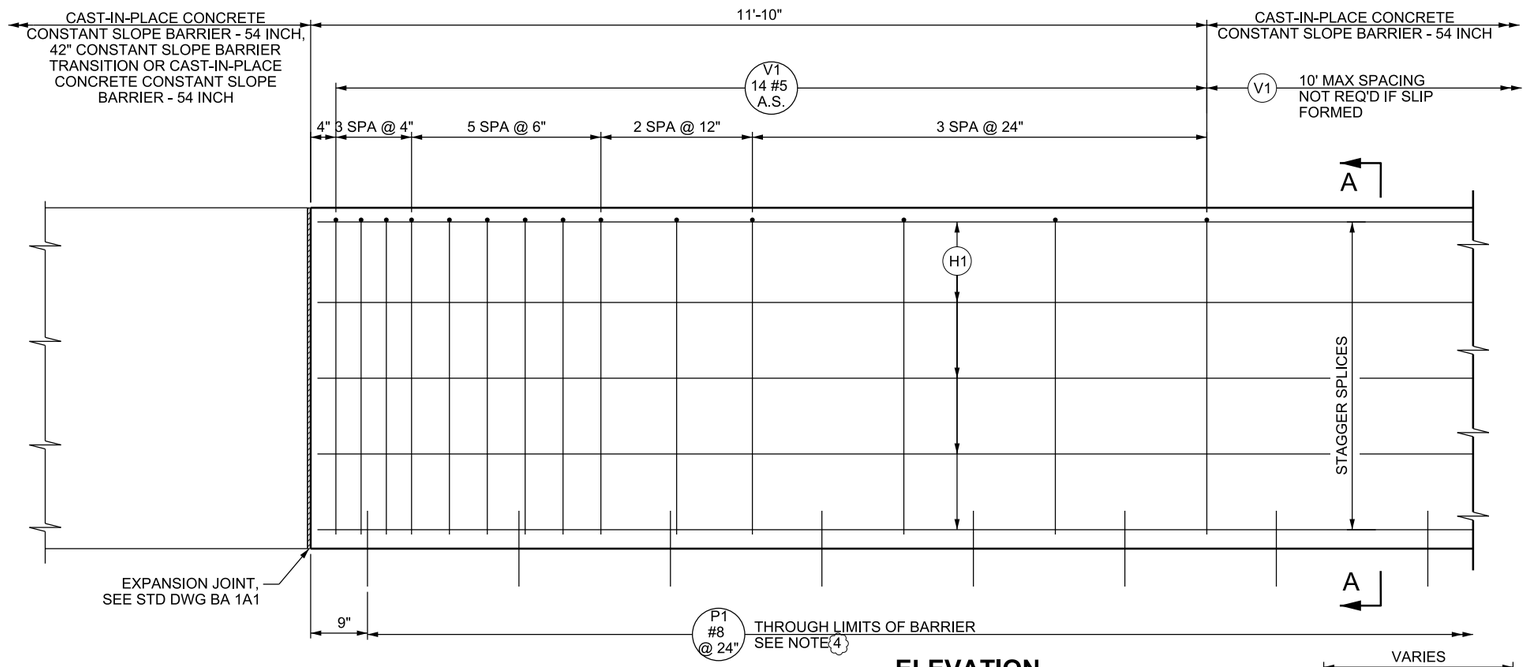
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

PRECAST CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH

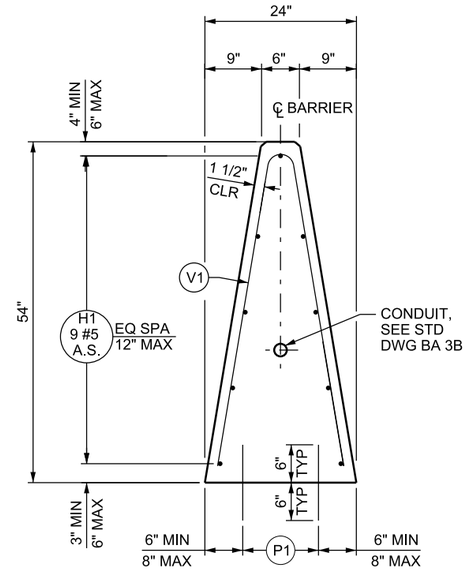
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3L

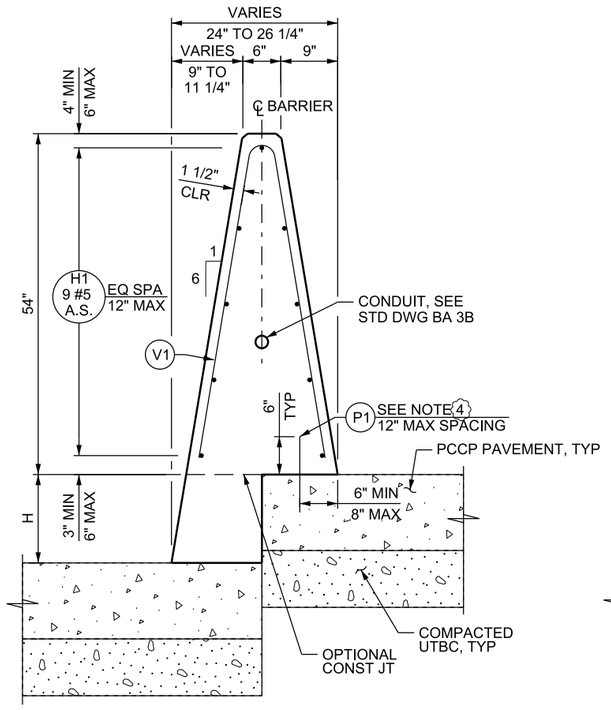


ELEVATION

54" CONSTANT SLOPE BARRIER SHOWN, STEPPED MEDIAN BARRIER SIMILAR

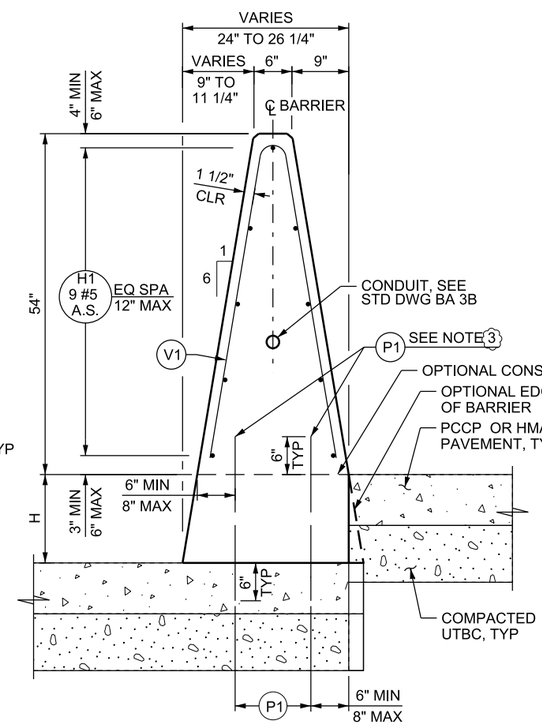


SECTION A-A



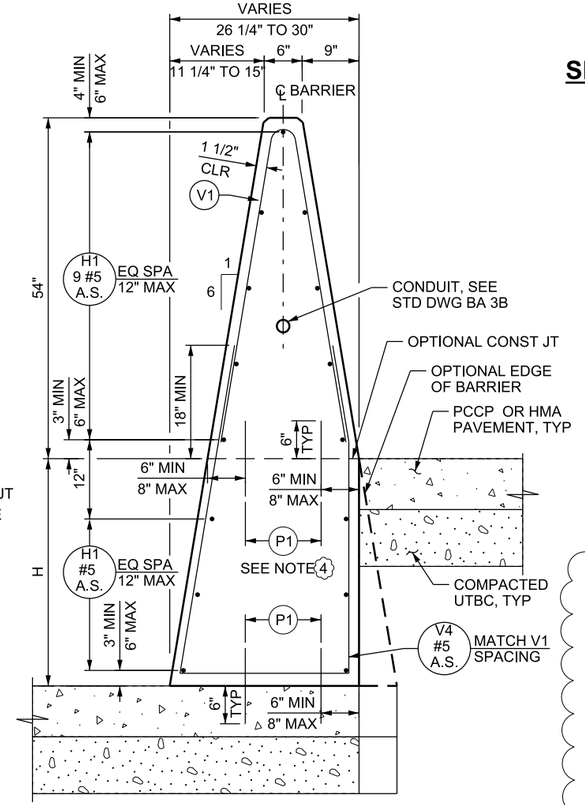
STEPPED MEDIAN BARRIER

H = 0 INCH TO 14 INCH (PCCP ONLY)



STEPPED MEDIAN BARRIER

H = 0 INCH TO 14 INCH (PCCP OR HMA)



STEPPED MEDIAN BARRIER

H = 14 INCH TO 36 INCH

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. V4 BAR SPACING MATCHES V1 SPACING SHOWN IN ELEVATION.
3. P1 BARS THROUGH THE OPTIONAL CONSTRUCTION JOINT ARE NOT REQUIRED IF THE CONSTRUCTION JOINT IS NOT USED OR IF V4 BAR IS PRESENT.
4. USE A MAXIMUM OF 12 INCH SPACING FOR P1 BARS. SEE STEPPED MEDIAN BARRIER DETAILS FOR APPLICABLE LOCATION.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE — DEPUTY DIRECTOR

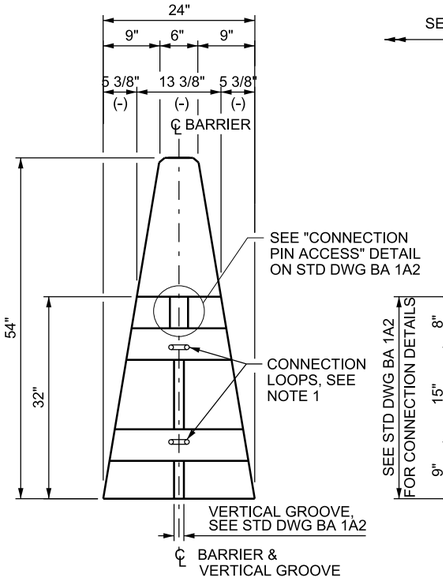
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH 1 OF 3

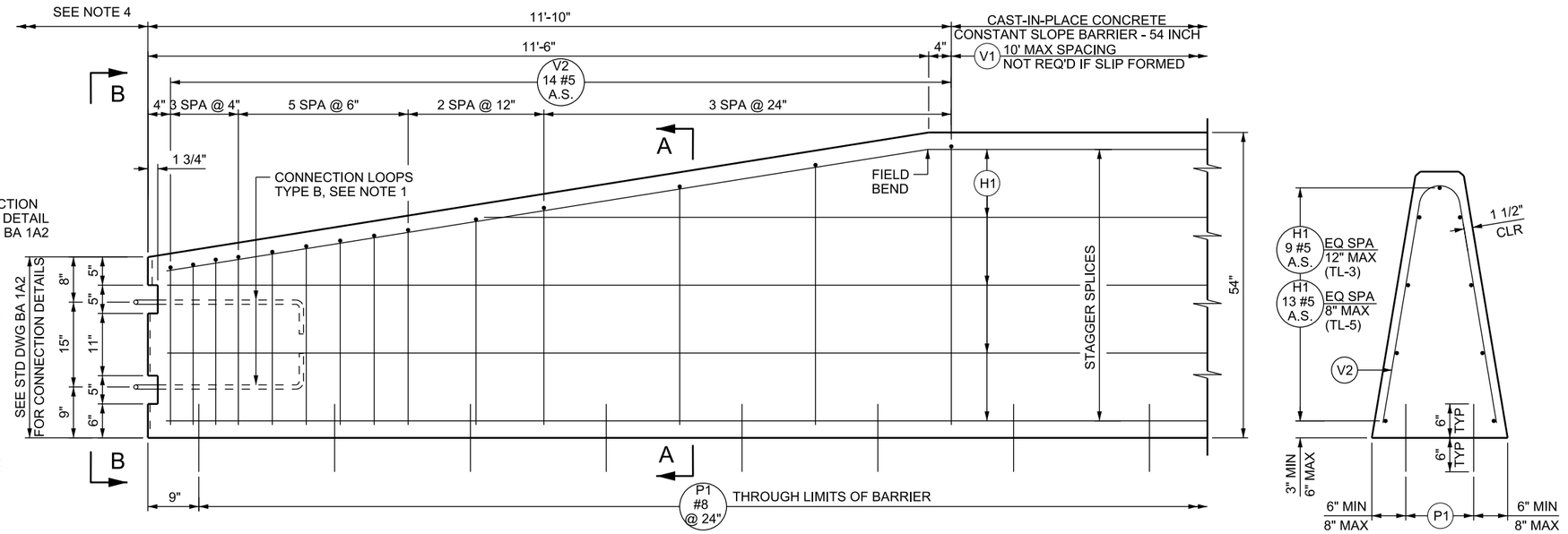
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3M1



VIEW B-B

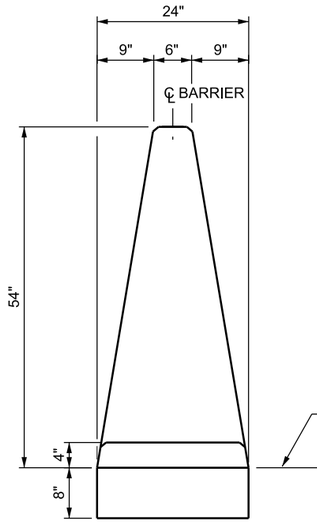


ELEVATION - APPROACH END SECTION

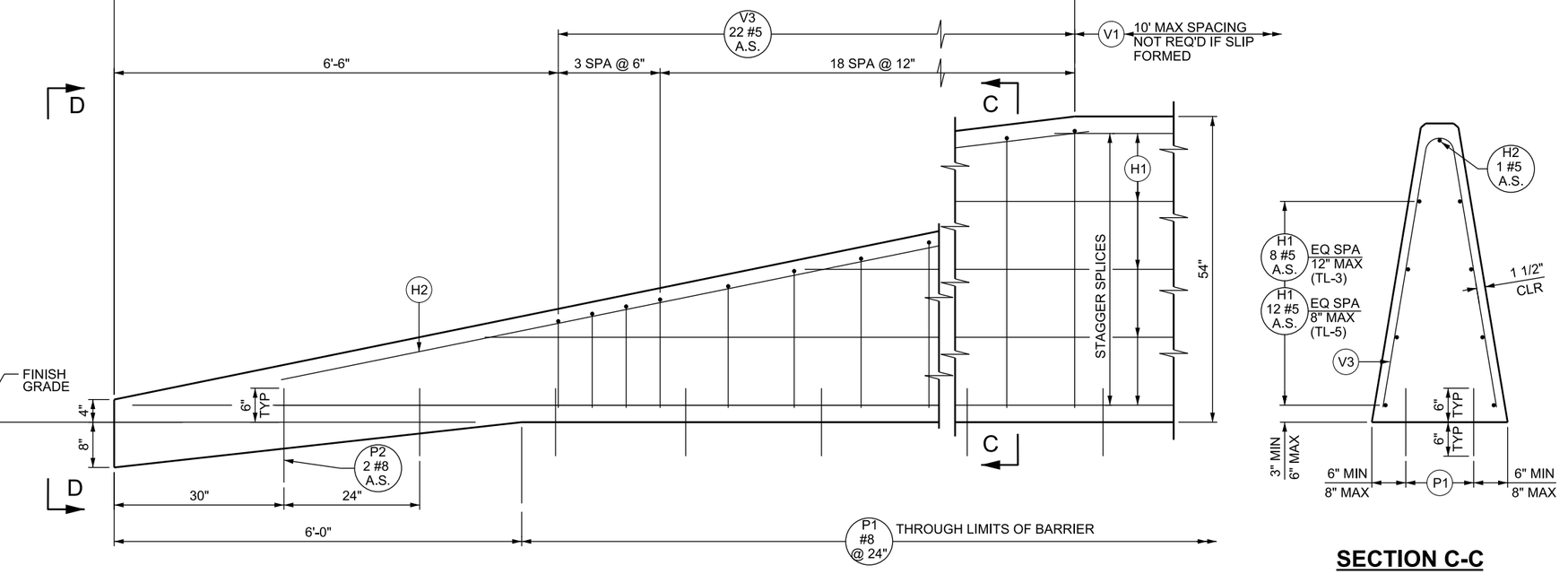
TL-3 SHOWN; TL-5 SIMILAR

SECTION A-A

TL-3 SHOWN; TL-5 SIMILAR



VIEW D-D



ELEVATION - TRAILING SLOPED END SECTION

TL-3 SHOWN; TL-5 SIMILAR

SECTION C-C

TL-3 SHOWN; TL-5 SIMILAR

NOTES:

1. SEE "BARRIER CONNECTION DETAIL" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
2. USE H1 AND P1 BARS CONSISTENT WITH THE TEST LEVEL RATING OF ADJACENT BARRIER.

SUPPLEMENTAL DRAWING

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	08/29/19	SDD	DELETED DESIGN ONLY NOTES.	

UTAH DEPARTMENT OF TRANSPORTATION
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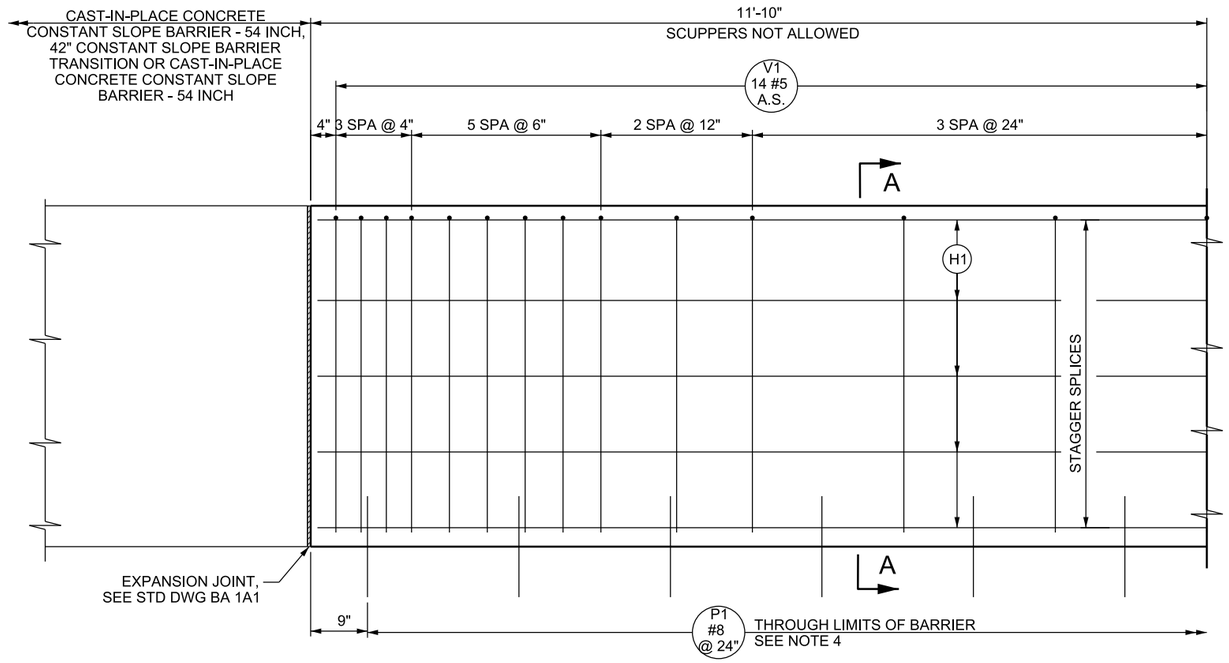
DEPUTY DIRECTOR

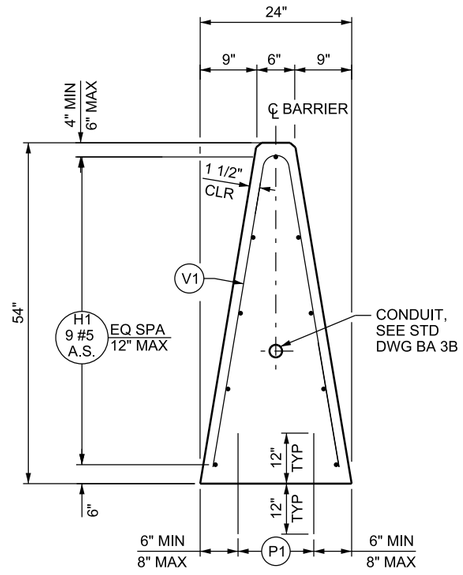
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH
2 OF 3
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3M2

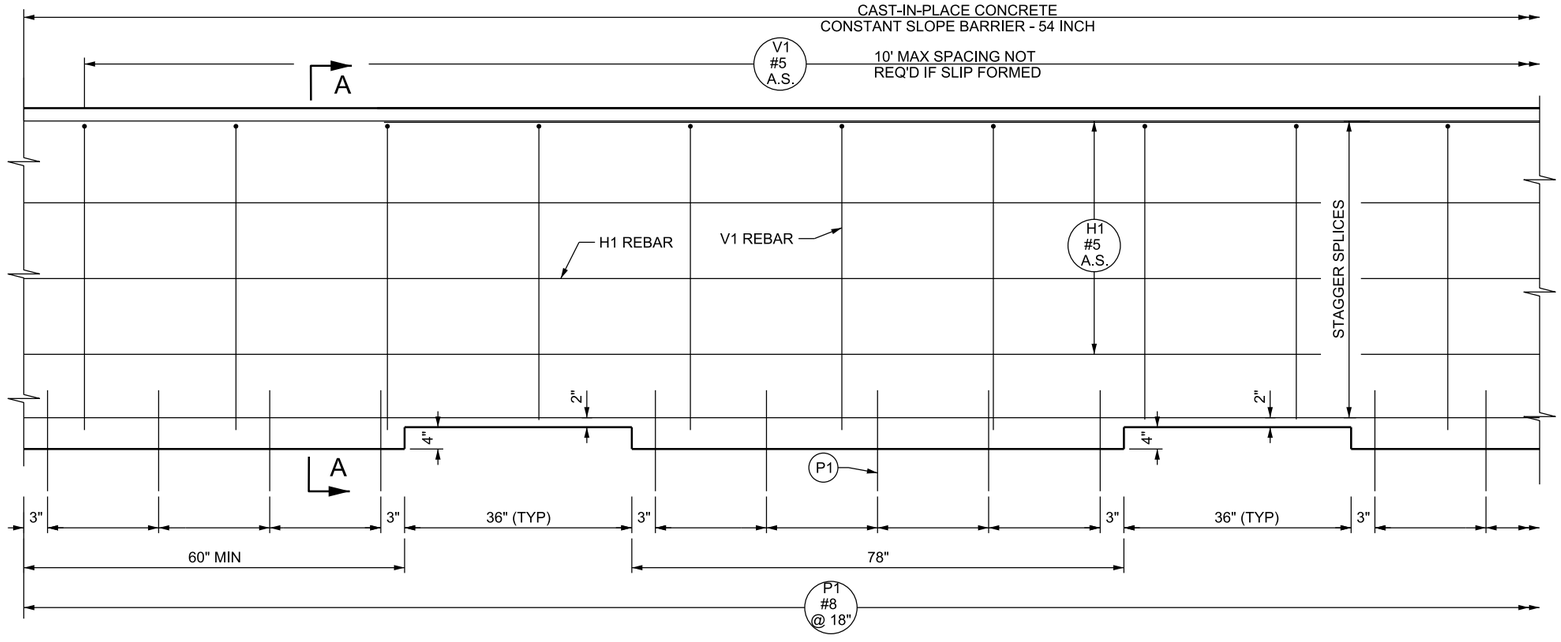
08-AUG-2019 DGN File: D:\Standards and Specs Section\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA03M2_DM.dgn



ELEVATION



SECTION A-A



ELEVATION

NOTES:

1. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
3. SEE STD DWG BA 3M3 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3A2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
6. SEE STD DWG BA 1A1 FOR GENERAL NOTES.

SUPPLEMENTAL DRAWING

REVISIONS

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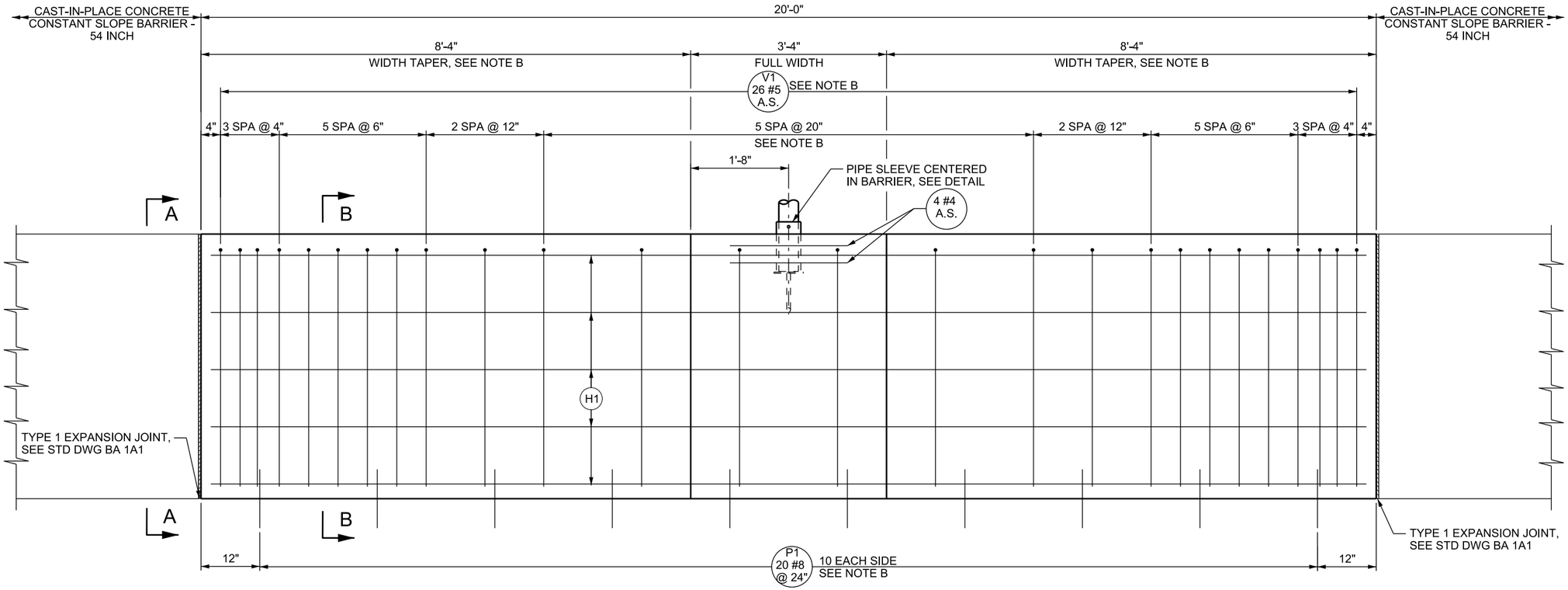
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER WITH SCUPPERS - 54 INCH

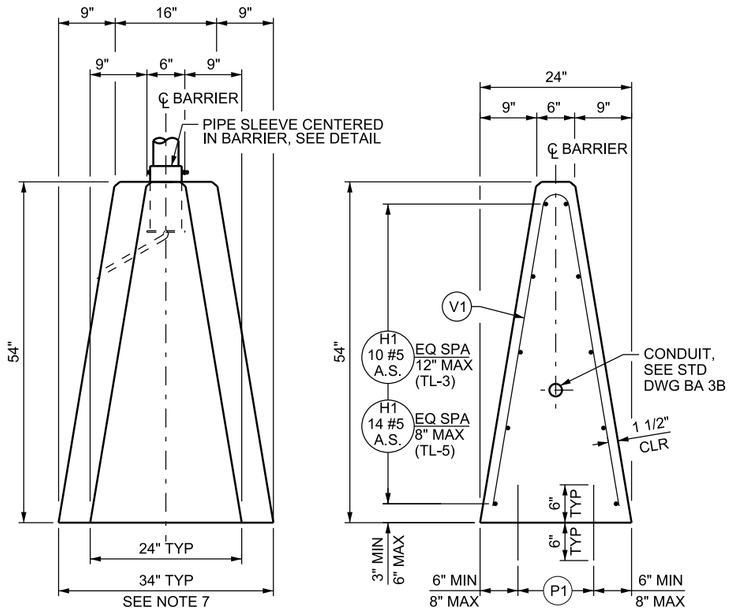
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3M4

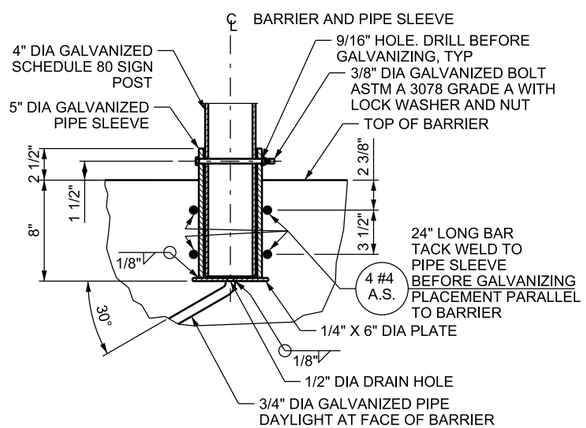


ELEVATION

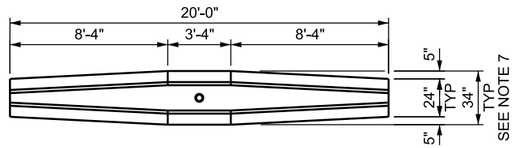


VIEW A-A

SECTION B-B



PIPE SLEEVE DETAIL



PLAN

DESIGN-ONLY NOTES:

A. SEE STD DWG BA 1B THROUGH BA 1D FOR TYPICAL LAYOUT REQUIREMENTS.

B. INCREASE LENGTH OF WIDTH TAPER AS NECESSARY TO PROVIDE APPROPRIATE FLARE RATE PER ROADSIDE DESIGN GUIDE. ADJUST REINFORCEMENT LENGTHS AS NECESSARY. ADD P1, V1 AND V2 BARS IN THE MIDDLE OF THE BARRIER TO MAINTAIN MAXIMUM SPACING.

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE SN SERIES STD DWG FOR SIGN MOUNTING, HARDWARE, AND PLACEMENT REQUIREMENTS. MAXIMUM SIGN PANEL AREA IS 36 SQ FT.
3. SEE STD DWG BA 3N2 FOR REINFORCING SCHEDULE.
4. USE PIPES CONFORMING TO ASTM A 53 GRADE B, ASTM A 500 GRADE B, OR ASTM API 5L GRADE B/X42. GALVANIZE IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION IS COMPLETED.
6. USE H1 AND P1 BARS CONSISTENT WITH THE TEST LEVEL RATING OF ADJACENT BARRIER.
7. TYPICAL SECTION SHOWN. VARY WIDTH AS SHOWN IF MEDIAN BARRIER IS STEPPED. REFER TO STD DWG 3M1 OR 3O2 AND ADJUST V4 BARS SIMILAR TO V1 BAR ADJUSTMENTS.

REVISIONS				
NO.	DATE	APPR.	REMARKS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

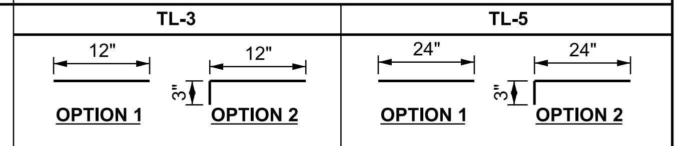
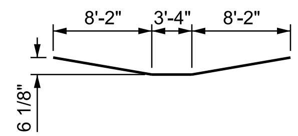
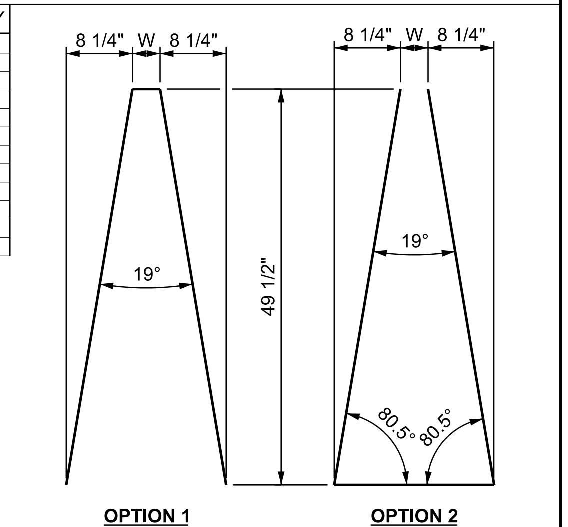
RECOMMENDED FOR APPROVAL	JAN.01, 2017 DATE	
CHAIRMAN STANDARDS COMMITTEE APPROVED	JAN.01, 2017 DATE	
DEPUTY DIRECTOR	DATE	

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, MEDIAN SMALL SIGN SECTION 1 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3N1

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
P1	#8	20	PAVEMENT TO BARRIER (VERTICAL)	
H1	#5	10 (TL-3) 14 (TL-5)	HORIZONTAL IN BARRIER TIED TO INSIDE OF V1 AND V3 BARS	
V1	#5	26	VERTICAL IN BARRIER TOTAL LENGTH = 23'-8"	

W	QTY
4"	2
4 1/2"	4
5"	2
5 1/2"	2
6 1/2"	2
7"	2
7 1/2"	2
8"	2
9 1/2"	2
10 1/2"	2
13"	2
13 1/2"	2

NOTES:

1. SEE STD DWG BA 3N1 FOR REINFORCING LOCATIONS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.

REVISIONS

NO.	DATE	APPR.	REMARKS

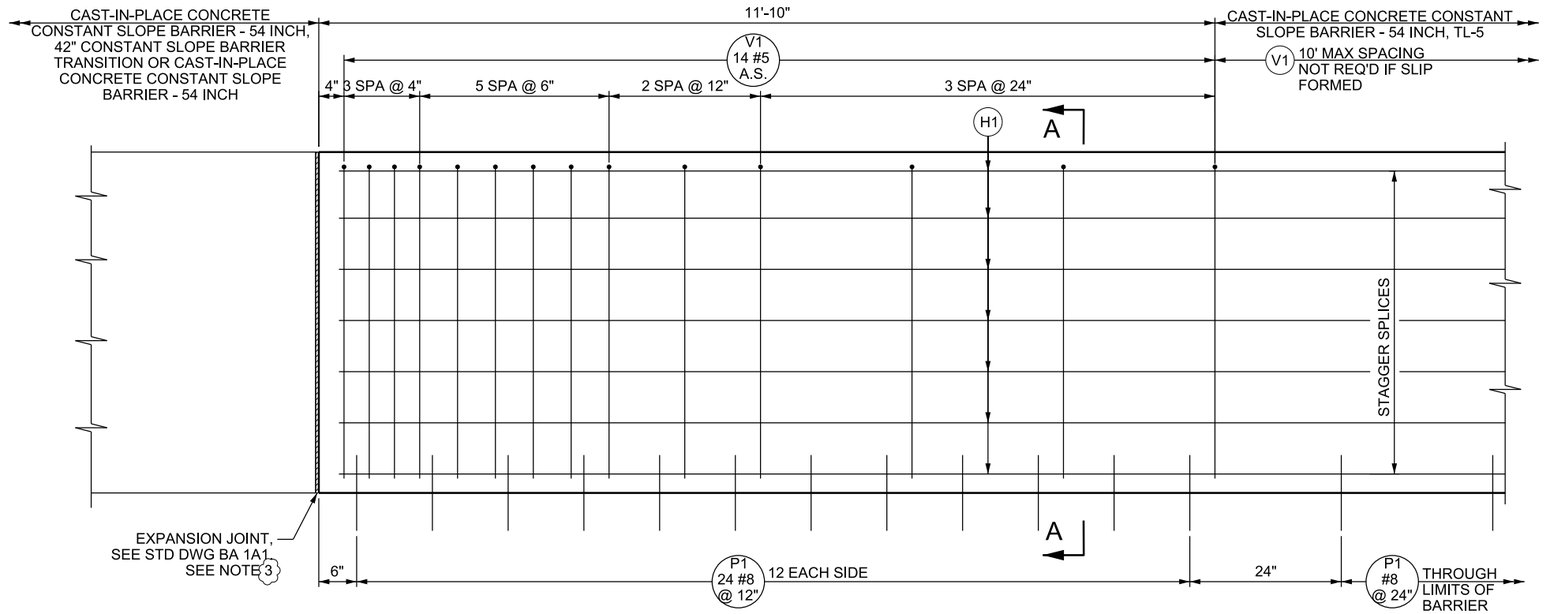
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN.01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR — JAN.01, 2017 DATE

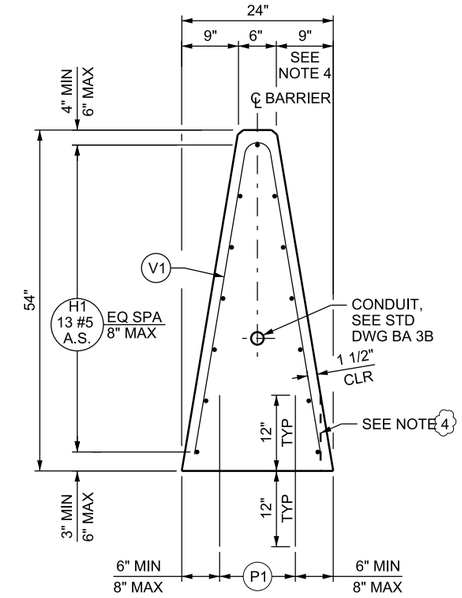
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, MEDIAN SMALL SIGN SECTION 2 OF 2

STANDARD DRAWING TITLE

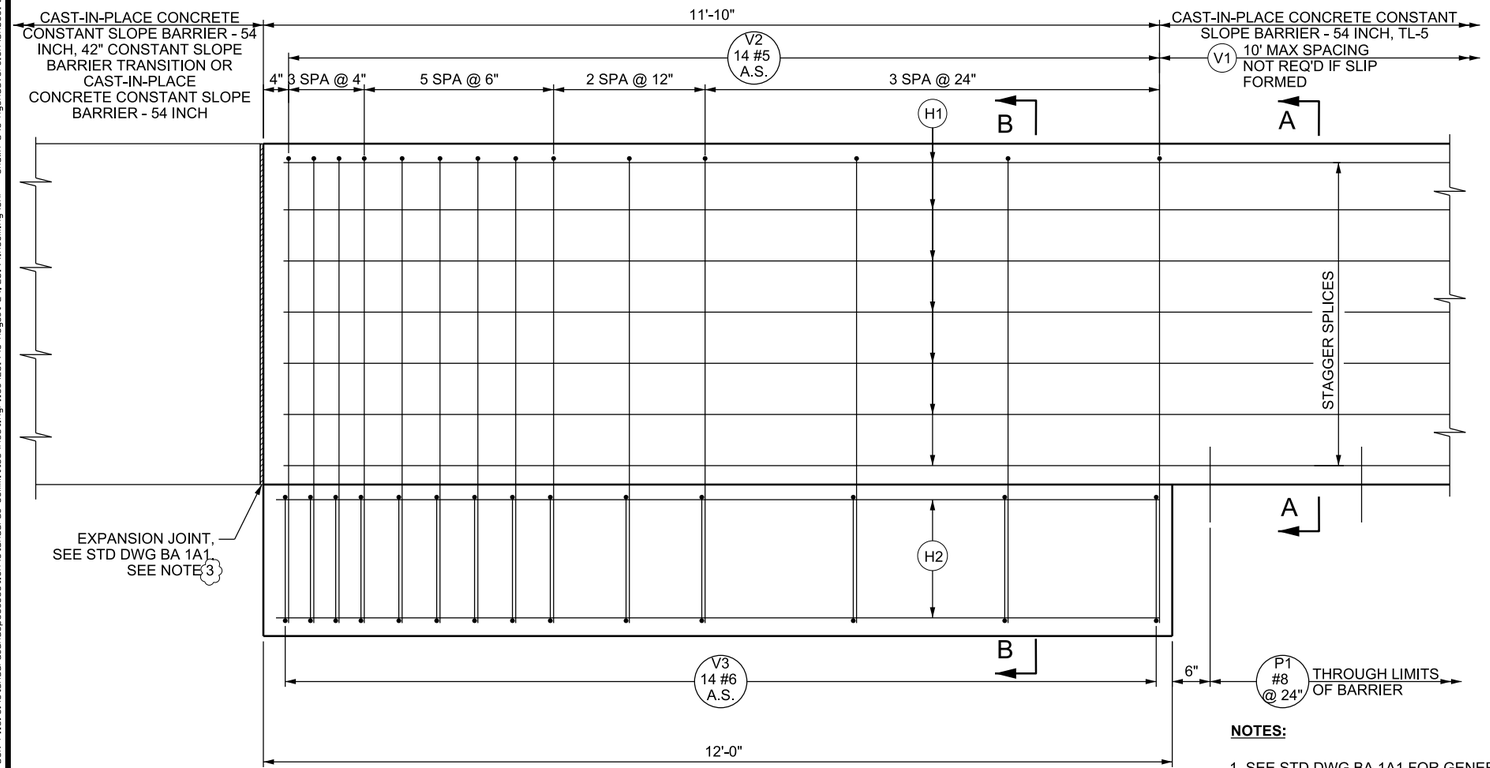
STD. DWG. NO.
BA 3N2



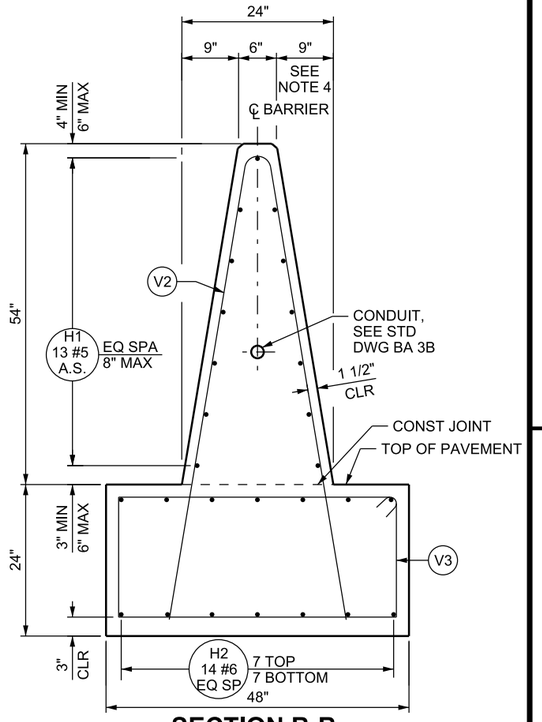
ELEVATION
BARRIER ON PCCP



SECTION A-A



ELEVATION
BARRIER ON HMA



SECTION B-B

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3O2 FOR STEPPED MEDIAN DETAILS AND STD DWG BA 3O3 FOR REINFORCING STEEL SCHEDULE.
3. SEE STD DGW BA 3M2 FOR APPROACH END AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
4. THE 9 INCH DIMENSION MAY BE REDUCED TO 7 INCHES AS SHOWN TO PROVIDE A MINIMUM 2 INCH CLEARANCE TO THE COLUMN IN COLUMN PROTECTION APPLICATIONS. ADJUST REINFORCING STEEL TO PROVIDE MINIMUM COVER.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

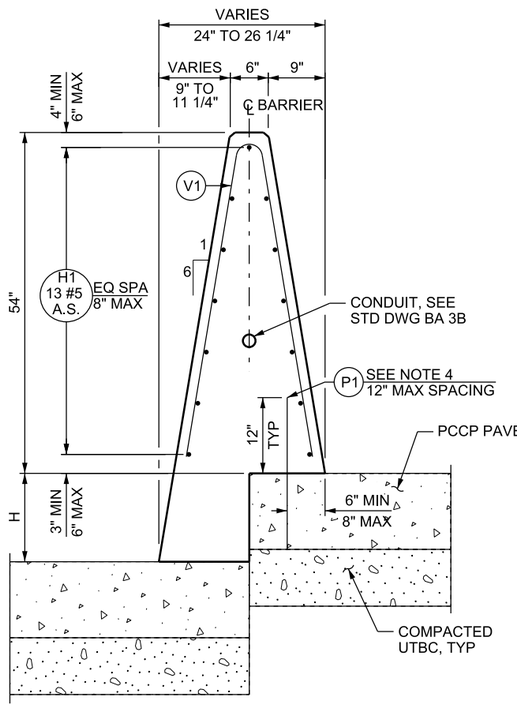
RECOMMENDED FOR APPROVAL	AUG. 29, 2019 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG. 29, 2019 DATE
DEPUTY DIRECTOR	

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-5
1 OF 3

STANDARD DRAWING TITLE

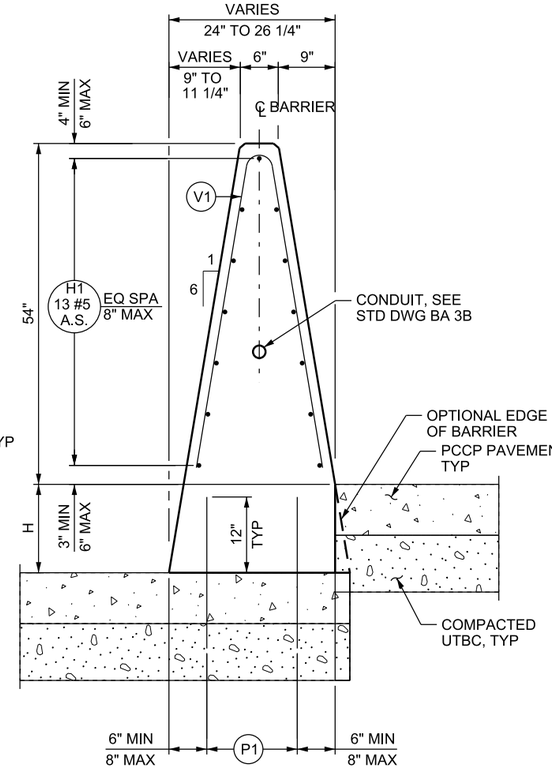
STD. DWG. NO.
BA 3O1

DGN File: D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2019\S-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA03O1 DM.dgn
08-AUG-2019



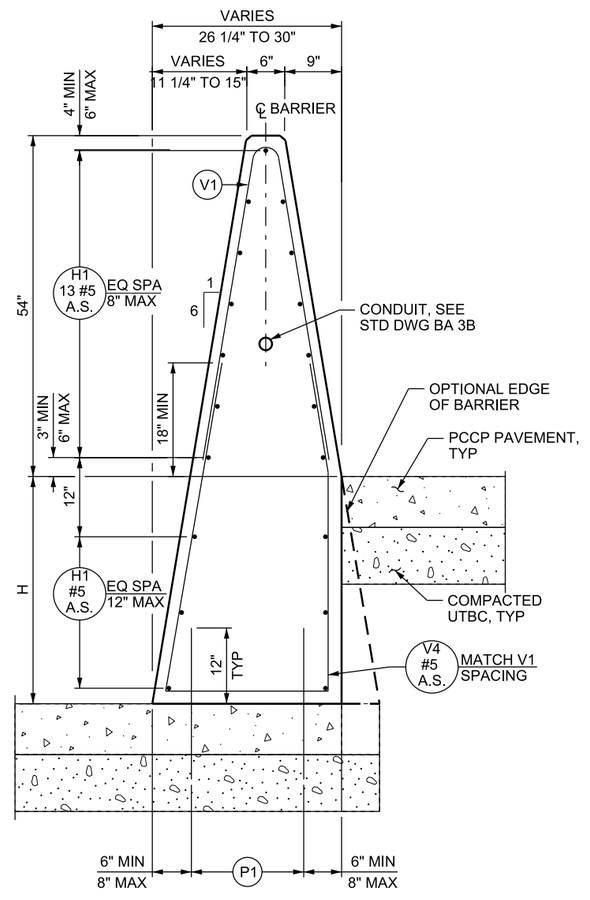
STEPPED MEDIAN BARRIER - PCCP ONLY

H = 0 INCH TO 14 INCH (OPTION 1)



STEPPED MEDIAN BARRIER - PCCP ONLY

H = 0 INCH TO 14 INCH (OPTION 2)



STEPPED MEDIAN BARRIER - PCCP ONLY

H = 14 INCH TO 36 INCH

NOTES:

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
2. V4 BAR SPACING MATCHES V1 SPACING SHOWN IN ELEVATION.
3. DECREASE P1 BAR SPACING BY HALF AS SHOWN ON STD DWG BA 3O1. SEE STEPPED MEDIAN BARRIER DETAILS FOR APPLICABLE LOCATION.
4. DO NOT USE HORIZONTAL CONSTRUCTION JOINTS IN TL-5 BARRIER.
5. DO NOT USE STEPPED MEDIAN BARRIER WITH HMA PAVEMENT.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

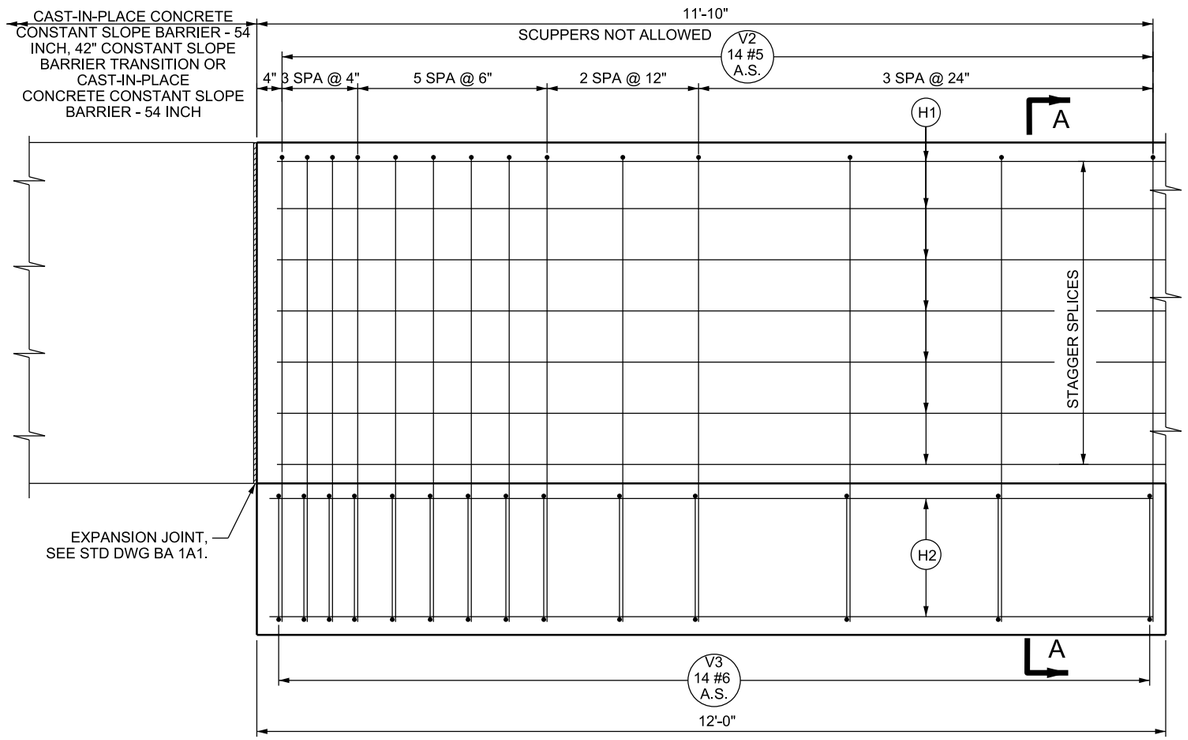
DEPUTY DIRECTOR

CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE BARRIER -
54 INCH, TL-5
2 OF 3

STANDARD DRAWING TITLE

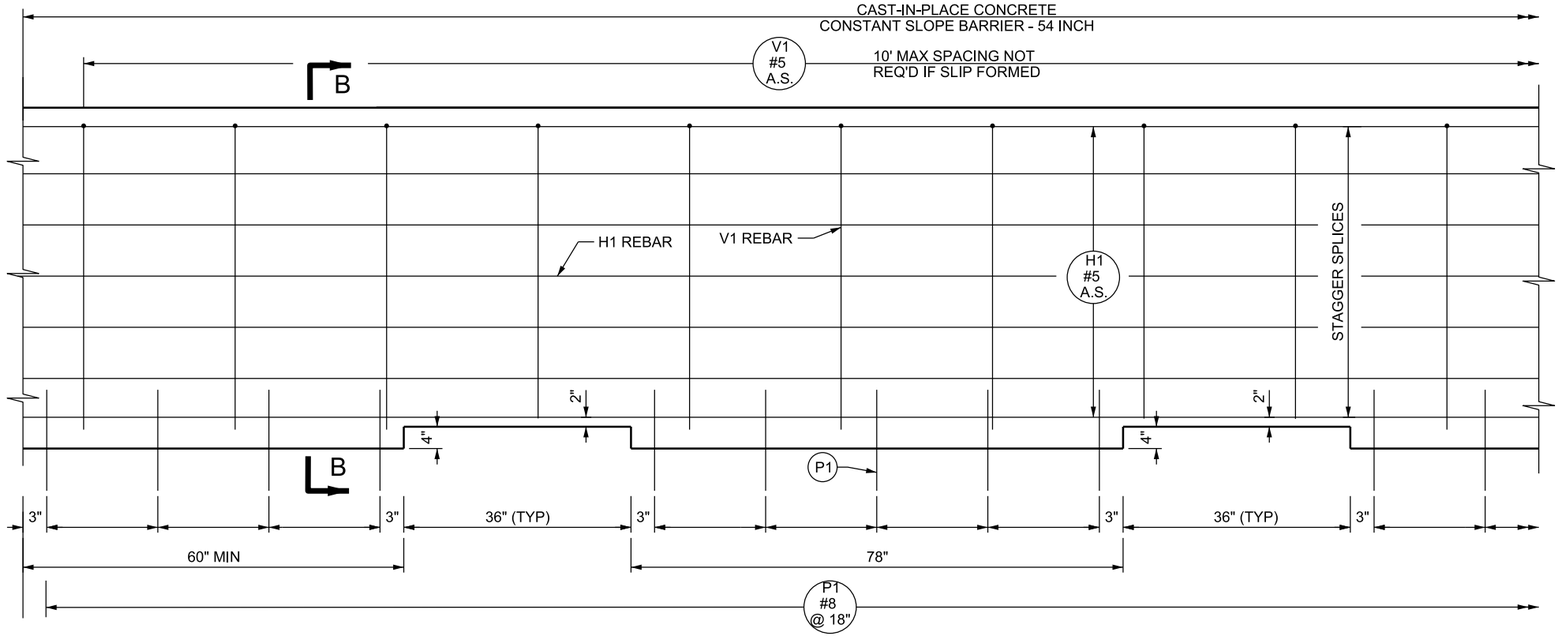
STD. DWG. NO.

BA 3O2

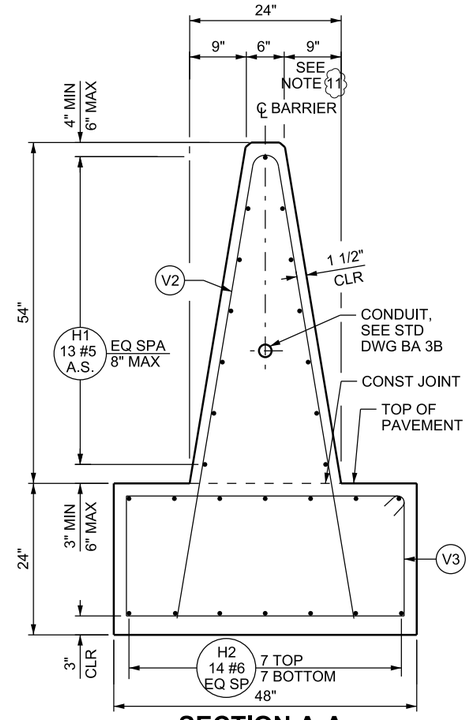


ELEVATION

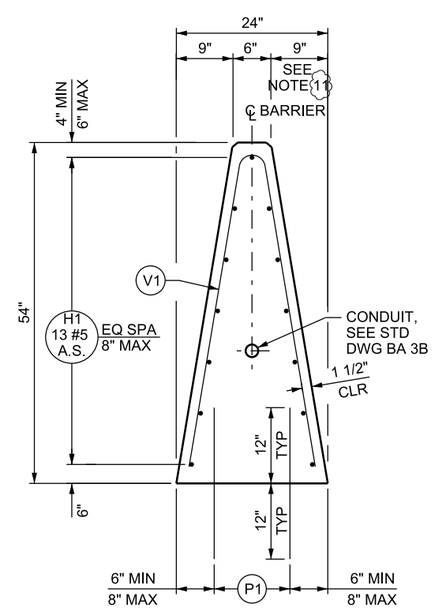
BARRIER ON HMA SHOWN
SEE BA O1 FOR BARRIER ON PCCP



ELEVATION



SECTION A-A



SECTION B-B

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
4. SEE STD DWG BA 3O3 FOR REINFORCING STEEL SCHEDULE AND NOTES.
5. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
6. SEE STD DWG BA 3M2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
7. THE 9 INCH DIMENSION MAY BE REDUCED TO 7 INCHES AS SHOWN TO PROVIDE A MINIMUM 2 INCH CLEARANCE TO THE COLUMN IN COLUMN PROTECTION APPLICATIONS. ADJUST REINFORCING STEEL TO PROVIDE MINIMUM COVER.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER WITH SCUPPERS- 54 INCH, TL-5

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3O4

DGN File: D:\Standards&Specs\Section\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA0304 DM.dgn
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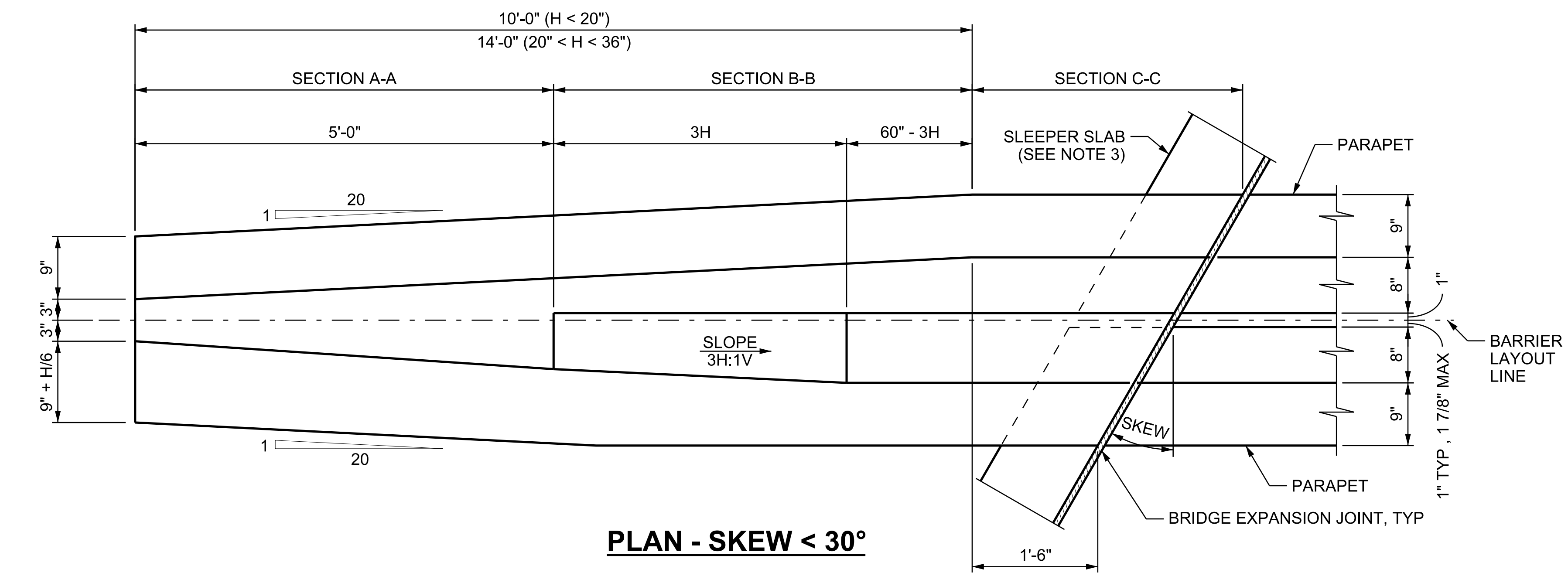
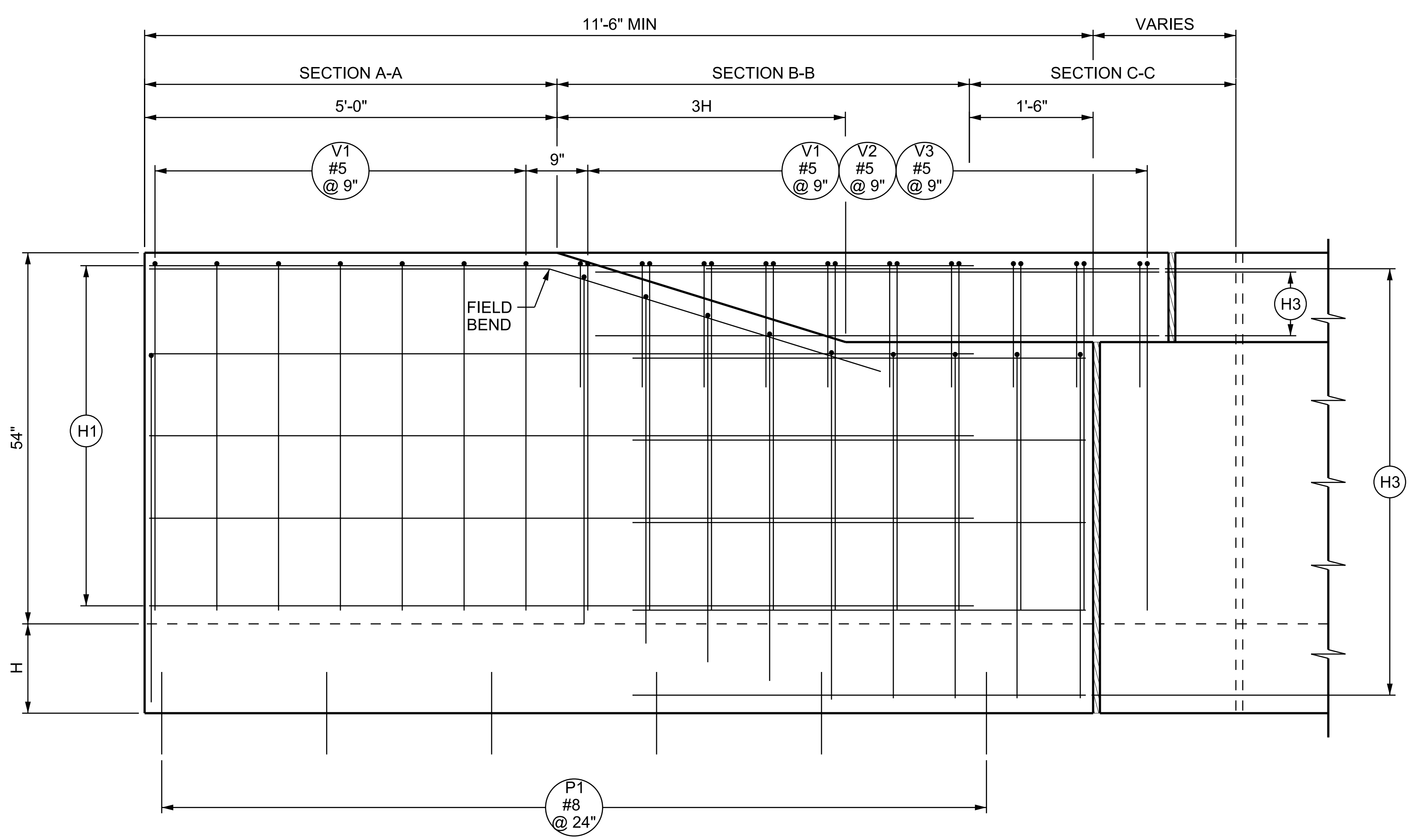


PLAN - SKEW < 30°



ELEVATION - SKEW < 30°

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3P3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.
3. SLEEPER SLAB ENDS AT FACE OF PARAPET FOR H GREATER THAN 14 INCHES.

SUPPLEMENTAL DRAWING

REVISIONS			
NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

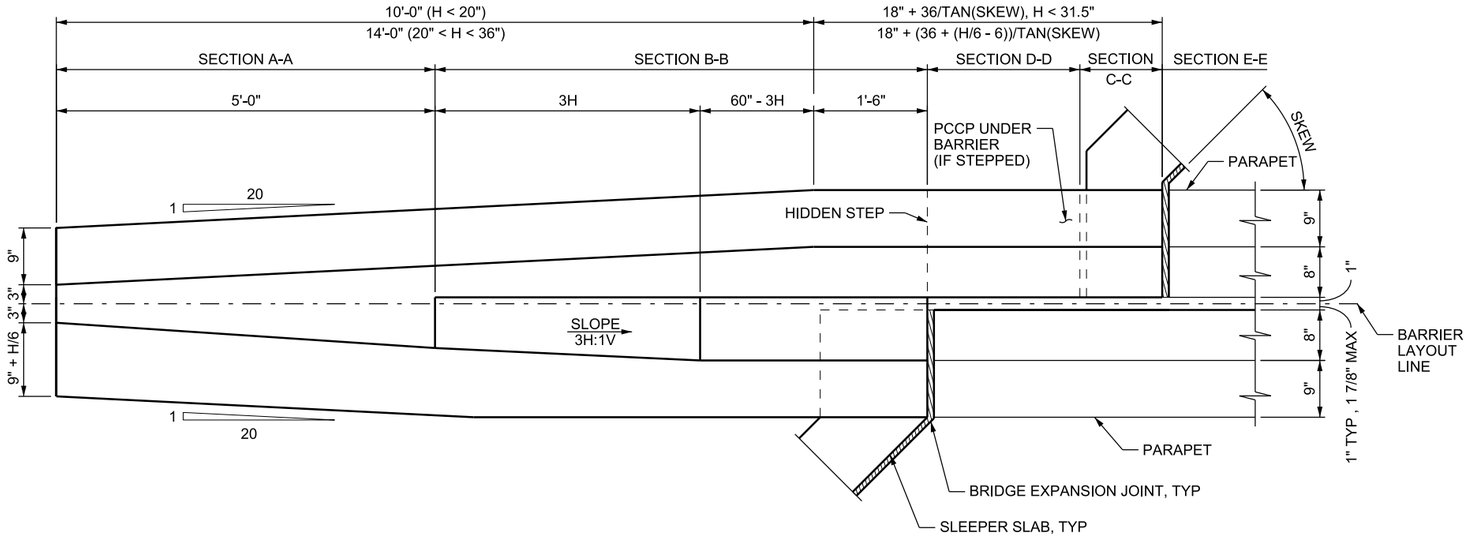
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, BRIDGE PARAPET TRANSITION 1 OF 3

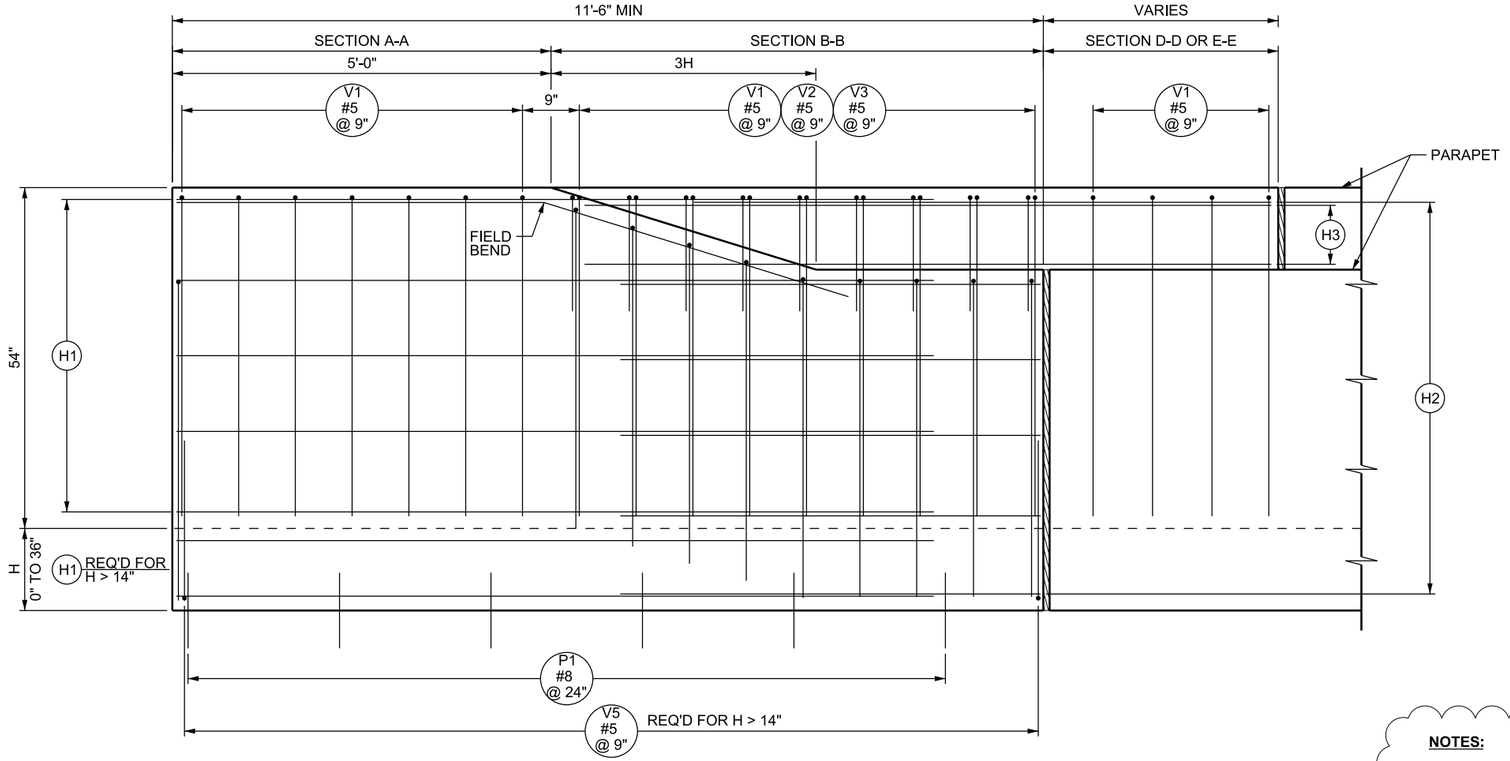
STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3P1



PLAN - H < 36 INCH, 30° < SKEW < 45°



ELEVATION - H < 36 INCH, 30° < SKEW < 45°

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3P3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

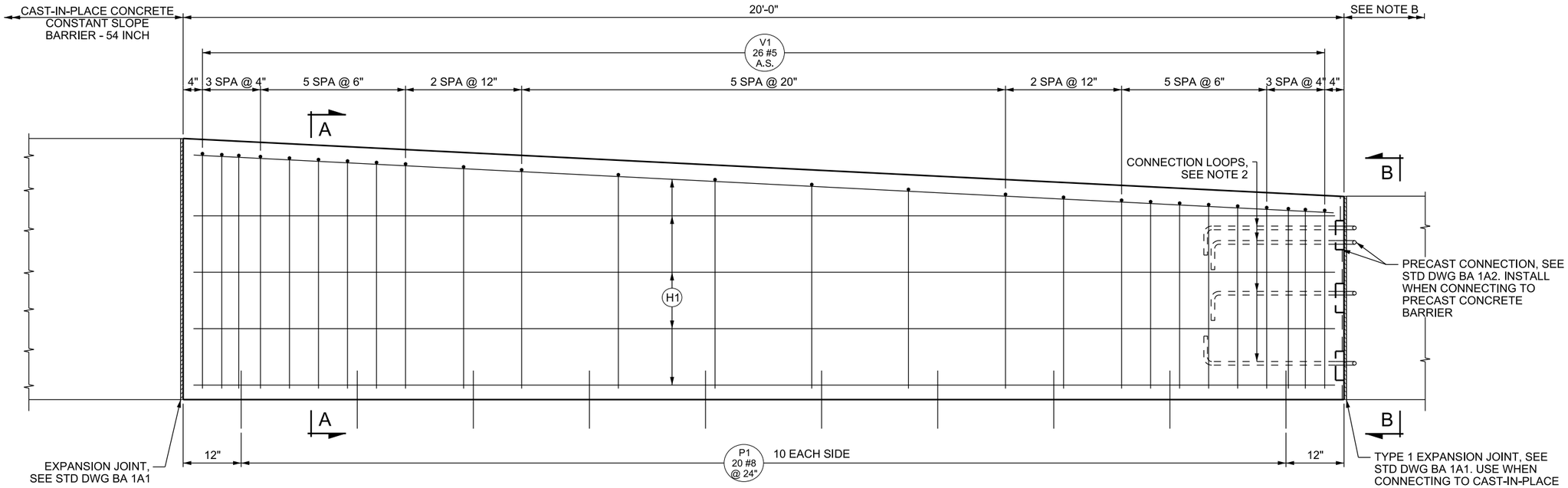
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

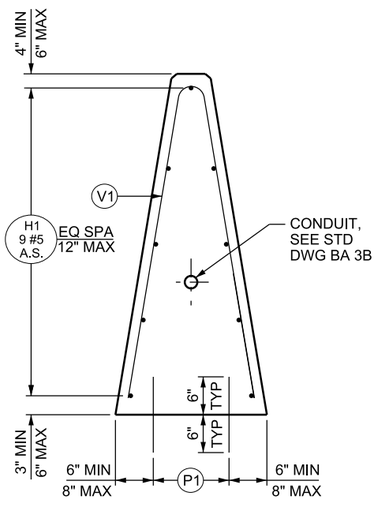
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, BRIDGE PARAPET TRANSITION 2 OF 3

STANDARD DRAWING TITLE

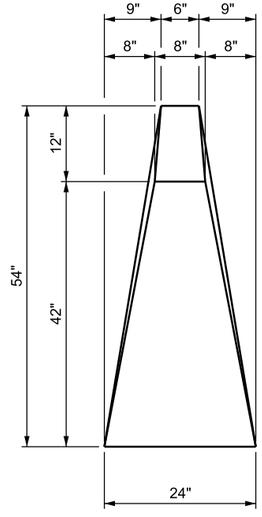
STD. DWG. NO.
BA 3P2



ELEVATION



SECTION A-A



VIEW B-B

BAR MARK	BAR SIZE	NO BARS	LOCATION	SKETCH
P1	#8	20	PAVEMENT TO BARRIER (VERTICAL)	12" OPTION 1; 12", 3" OPTION 2
H1	#5	9	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-8"
V1	#5	26	VERTICAL IN BARRIER	W1, W2, W1; H; 19 ½"

H	W1	W2	QTY
49 1/2"	8"	3 1/2"	1
49"	8"	3 1/2"	2
48 1/2"	8"	3 1/2"	2
48"	8"	3 1/2"	2
47 1/2"	8"	3 1/2"	1
47"	8"	3 1/2"	1
46 1/2"	8"	3 1/2"	1
46"	8"	3 1/2"	1
45"	7 1/2"	4 1/2"	1
44"	7 1/2"	4 1/2"	1
43"	7 1/2"	4 1/2"	1
42"	7 1/2"	4 1/2"	1
41"	7 1/2"	4 1/2"	1
40 1/2"	7 1/2"	4 1/2"	1
40"	7 1/2"	4 1/2"	1
39 1/2"	7 1/2"	4 1/2"	1
39"	7 1/2"	4 1/2"	1
39"	7 1/2"	5 1/2"	1
38 1/2"	7"	5 1/2"	2
38"	7"	5 1/2"	2
37 1/2"	7"	5 1/2"	1

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS. PLACE THE APPROPRIATE CONNECTION LOOP CONFIGURATION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. DRILL AND EPOXY BOND P1 BARS, OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
4. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

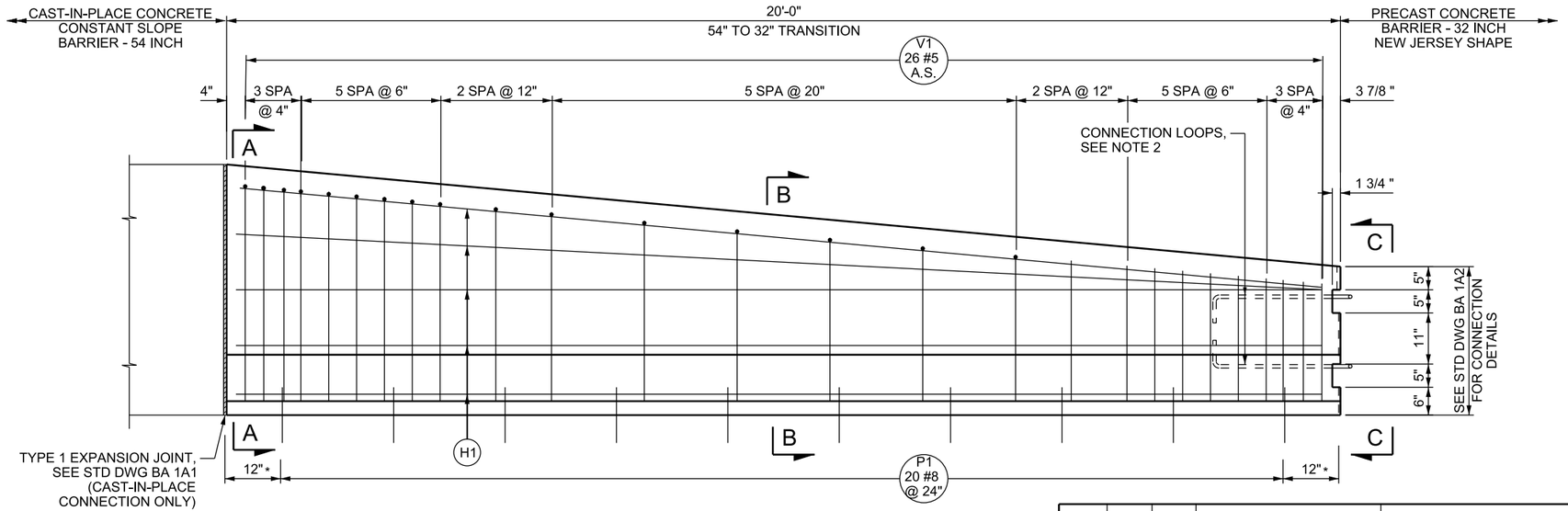
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, 42 INCH CONSTANT SLOPE BARRIER TRANSITION

STANDARD DRAWING TITLE

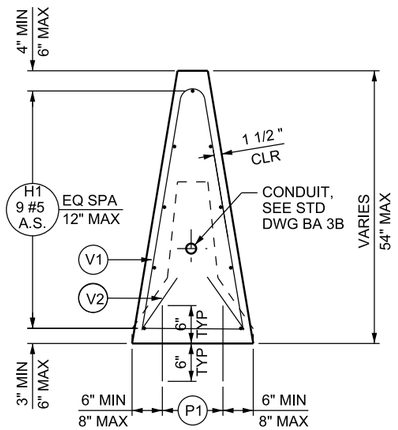
STD. DWG. NO.
BA 3Q1

DGN File: D:\Standards and Specs Section\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\SAF - Shaun D\3-AgendaVersion\BA03Q1 DM.dgn
08-AUG-2019

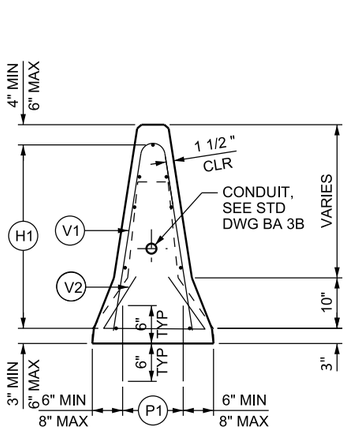


ELEVATION

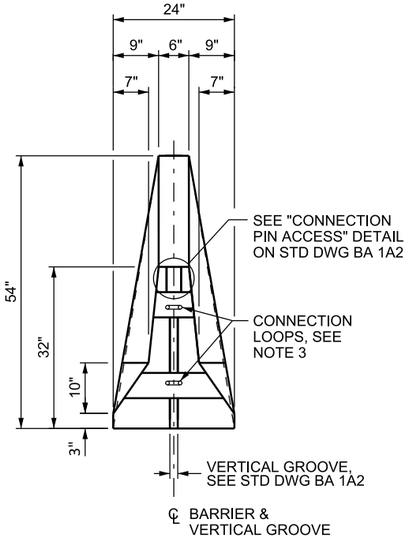
BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	9	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-6"
P1	#8	20	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	12" OPTION 1; 3" 12" OPTION 2
V1	#5	26	VERTICAL IN BARRIER	H / W / QTY: 46 1/2" / 19 1/2" / 1; 46" / 19 1/2" / 1; 46" / 19" / 1; 45 1/2" / 19" / 1; 45" / 19" / 1; 44 1/2" / 18 1/2" / 1; 44" / 18" / 1; 43 1/2" / 18" / 1; 42 1/2" / 17 1/2" / 1; 41 1/2" / 17" / 1; 40 1/2" / 16 1/2" / 1; 38 1/2" / 15 1/2" / 1; 37" / 15" / 1; 35" / 14" / 1; 33" / 13" / 1; 31 1/2" / 12" / 1; 30" / 11 1/2" / 1; 29" / 11" / 1; 28 1/2" / 11" / 1; 28" / 10 1/2" / 1; 27 1/2" / 10" / 1; 27" / 10" / 1; 26 1/2" / 9 1/2" / 1; 26" / 9 1/2" / 1; 25 1/2" / 9" / 1; 25" / 9" / 1 — H, W, 2" R
V2	#5	18	VERTICAL IN BARRIER TIE TO V1 BARS TOTAL LENGTH = 3'-7 1/2"	12", 55°, 55°, 12", 19½"



SECTION A-A



SECTION B-B



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS. PLACE THE APPROPRIATE CONNECTION LOOP CONFIGURATION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
4. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS.
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
6. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ±1/2 INCH AS DIMENSIONED.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, 32 INCH NEW JERSEY SHAPE BARRIER TRANSITION

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3Q2

DGN Files:D:\StandardsAndSpecsSection\Standards Committee\MeetingFiles\2019\15-August 29, 2019\Incoming\SAF - Shawn D\3-AgendaVersion\BA0302 DM.dgn
08-AUG-2019

Standards Committee Submittal Sheet

Name of Preparer: Jesse Sweeten

Title/Position of Preparer: Traffic Signal Engineer

Specification/Drawing/Item Title:
SL 6D – Overhead Flashing Beacon at an Intersection Crosswalk
SL 6F – Overhead Flashing Beacon at a Midblock Crosswalk

Specification/Drawing Number: **SL 6D, SL 6F**

Priority Level (see last page for explanation) Three

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

Due to questions expressed by field personnel and designers, clarifications and updates to the drawings have been requested for better understanding and applicability.

SL 6D – This standard drawing detailed overhead flashing beacons with Type 0 signal heads but lacked information regarding an overhead rectangular rapid flashing beacon (RRFB) application. The RRFB option was added to this sheet along with updates/additions to the notes and callouts.

SL 6F – This standard drawing detailed overhead flashing beacons with Type 0 signal heads but lacked information regarding an overhead rectangular rapid flashing beacon (RRFB) application. The RRFB option was added to this sheet along with updates/additions to the notes and callouts.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
No Change

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
No Change

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to

complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements
   No Change

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)
   No Change

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?
   No modifications needed.

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).
   Selecting the RRFB option in an application would cost more money in materials (each unit is about $3-$4K—approx. 3x the cost of the Type 0 signal head flashing beacon assembly option) however, the department considers this cost to be reasonable since they do achieve a better compliance, therefore increasing safety.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).
The RRFB option would require more cost in material compared to the Type 0 signal head option, but labor costs to maintain them would not be any different.

3. Life cycle cost.
The RRFB option is a fairly newer item being implemented but there are no expected increases in life cycle cost.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**
These changes are beneficial because they provide instructional clarity, address feedback from the field, reflect current practices, and improve safety.

H. Safety Impacts?
Not applicable.

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.
Not applicable. Already covered above.

Priority Explanation

Enter the appropriate priority in the box on the first page of the document.

Review Standards Committee Policy 08A-05 and related Procedure 08A5-01.5 prior to determining the Priority.

Priority 1 Upon posting, this impacts all projects in construction and design with a Change Order, Addenda, and immediate change to projects being advertised.

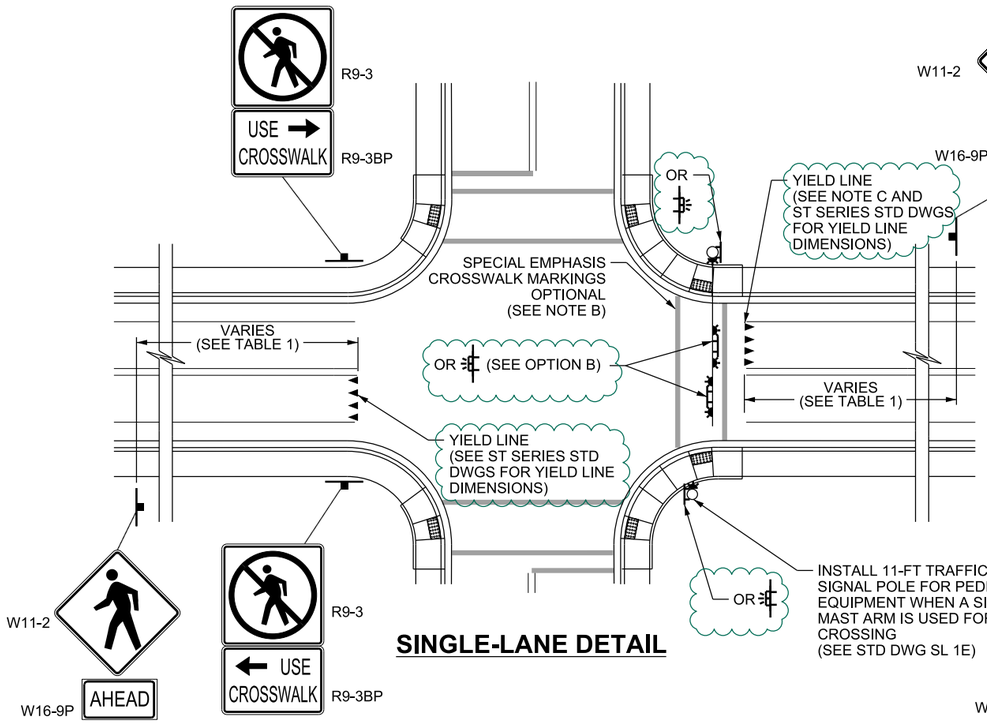
Priority 2 Upon posting, this impacts projects being advertised.

Priority 3 Upon posting, the approved standard takes effect **four weeks** later for projects being advertised.

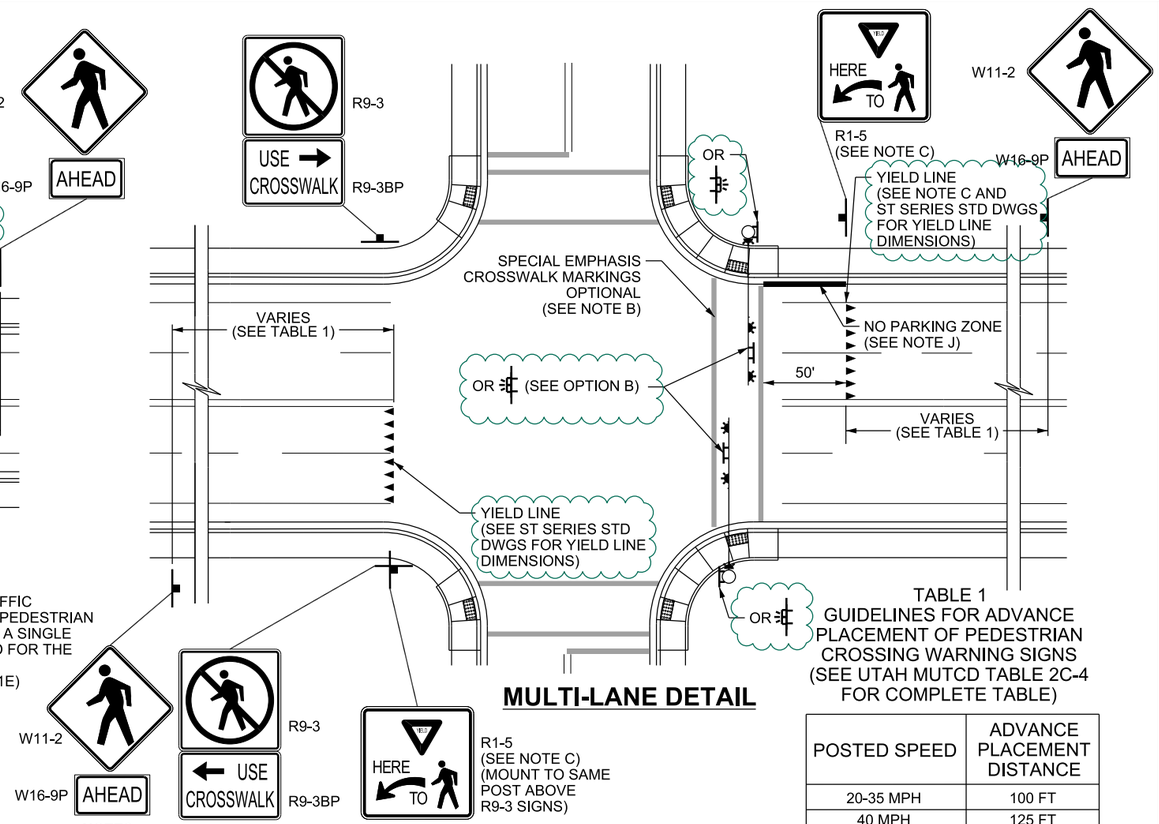
Priority 4 Applicable to a new edition of the Standards only.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
7/11/2019 10:05:50	bbyeates@utah.gov	Brad	SL Drawings	Test Comment		
7/11/2019 10:07:05	brad@email.com	Brad	SL Drawings	Test Comment		
7/11/2019 10:44:01	glukes@utah.gov	George Lukes	test	test		
7/12/2019 8:33:27	kthornock@utah.gov	Kirk Thornock	SL06D & 06F	No comments on content, please don't send a drawing with yellow in it. Was extremely hard to read.		
7/12/2019 9:18:53	dfriant@utah.gov	Daryl Friant	SL06D SL06F	No Comments		
7/12/2019 10:06:29	Rferrin@utah.gov	Ryan Ferrin	SL6D	No comments		
7/12/2019 10:06:56	Rferrin@utah.gov	Ryan Ferrin	SL6F	No comments		
7/12/2019 11:22:23	shawnlambert@utah.gov	Shawn Lambert	SL 06 Series Drawing	No Comments		
7/15/2019 7:00	michellepage@utah.gov	Michelle Page	SL 6D & SL 6F	No Comments		
7/18/2019 14:30:09	jtremaine@utah.gov	Janice	SL Drawings	No comment		
7/18/2019 16:48:12	michaeladams@utah.gov	Michael A. Adams	SL 6D, SL 6F	No Comment		
7/23/2019 15:30:14	Branden@utah.gov	Branden Anderson	No Comment	No Comment		
7/24/2019 14:14:01	Roland.Stanger@dot.gov	FHWA	SL 6D, SL 6F	No Comment		
7/25/2019 7:48:21	dlahusen@avenueconsult	ACEC	SL-6	Consider removing drawings from Standard Drawings and only have available to Designers. Seems like the contractor should be placing these types of crossings and associated equipment based off of design plans and not from the standard drawings	The RRFBs will remain on the standard drawings.	Jesse Sweeten
7/25/2019 10:19:38	vliu@utah.gov	Vincent Liu	SL 6D & SL 6F	Do we have detail drawing for RRFB placements on both overhead and pole-mounted installation?	Note 3 added to clarify this. Cross-reference added to SL 3D.	Jesse Sweeten
7/25/2019 12:49:49	mcrasmussen@utah.gov	Marjorie Rasmussen	SL Drawings	SL 6F Why can't we mix flashing beacon types?- see note M. Note O needs to be re-worded, it is a little confusing.	Reworded Note M and Note O for clarification. Note O now becomes Note N.	Jesse Sweeten
7/29/2019 8:09:35	betty@wadsco.com	AGC	SL 06D & 06F	No comments from AGC		
7/29/2019 17:00:54	btownsend@utah.gov	Bill Townsend	No Comment	No Comment		
7/29/2019 17:20:50	fdoehring@utah.gov	Fred Doehring	All	Have these changes been coordinated with Tiffany's changes? Some of the items that are changed on these sheets have not been changed on Tiffany's.	We have verified this. We have changed wording on Note B and callouts to reference the ST Series rather than a specific drawing.	Jesse Sweeten
7/30/2019 8:51:25	kbarrett@utah.gov	Kelly Barrett	SL06D SL06F	Nothing of Concern		
7/31/2019 11:12:36	brettslater@utah.gov	Brett Slater	SL 6D, SL 6F	No Comments		
8/1/2019 10:14:30	cmason-hill@utah.gov	Charles Mason-Hill	SL-06D & F	Should the mounting of the RRFB below the sign over traffic show the point of minimum clearance?	General Note 5 on SL 1A addresses this.	
7/17/2019 9:15	alough@utah.gov	Adam Lough	All	My only comment is that we need to show a mounting detail for the sign and RRFB for the overhead application. I think Z-bar on the sign attached to a vertical Pelco Astro Bracket mount will work best. The Pelco tube can extend below the sign and can be used to attach the RRFB.	Note 3 added to clarify this. Cross-reference to SL 3D added.	Jesse Sweeten
7/25/2019 12:21	aguevara@utah.gov	Andrea Guevara	All	Note F: Is the speed intended to be the 85 percentile or posted speed limit? Is it intentionally left up for interpretation?	This should be the posted speed. Wording added to Note F.	Jesse Sweeten
7/25/2019 12:21	aguevara@utah.gov	Andrea Guevara	All	Note M: I'm not clear on what this note means. Is it for a type 0 flashing beacon only? An RRFB system needs the pole mounted units (and they are shown) even with the overhead unit so that the pedestrian pilot light is visible.	Note M reworded for clarification.	Jesse Sweeten
7/25/2019 12:21	aguevara@utah.gov	Andrea Guevara	All	Note N seems more like a construction than design note to me since it will be contractor who orders the units (unless they are going to be state furnished in the near future)	Note N moved to be general Note 4.	Jesse Sweeten

7/25/2019 12:21	aguevara@utah.gov	Andrea Guevara	All	Note 0: Note indicates to mount horizontally but graphic shows them mounted vertically. Is the note trying to say that the units are to be horizontally centered over the travel lanes? "On the mast arm" in the middle of that phrase confuses the meaning.	Removed "horizontally" from Note O. Note O now becomes Note N.	Jesse Sweeten
7/25/2019 12:21	aguevara@utah.gov	Andrea Guevara	All	Call out on mast arm RRFB for note N: do we really want the ped pilot lights on the overhead RRFB units? It doesn't seem like they would be very effective up there.	Removed callout to note on overhead detail.	Jesse Sweeten
7/25/2019 12:21	aguevara@utah.gov	Andrea Guevara	All	Do we foresee only one overhead RRFB in all circumstances or do we need a note similar to note E for the RRFBs?	The standard will be to meet the interim approval requirements to have at least two RRFBs in each traveled direction.	Jesse Sweeten



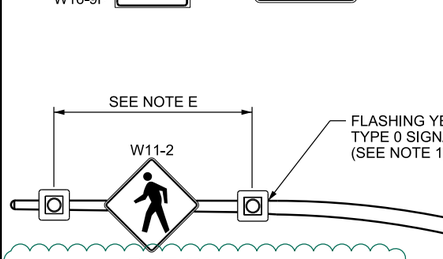
SINGLE-LANE DETAIL



MULTI-LANE DETAIL

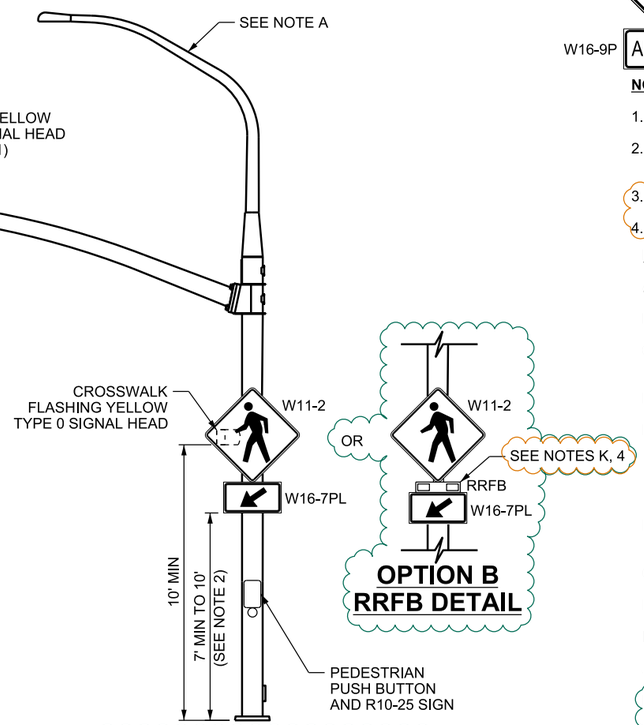
TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH	125 FT
45 MPH	175 FT



OPTION A FLASHING BEACON DETAIL

OPTION B RRFB DETAIL



OPTION A FLASHING BEACON DETAIL

OPTION B RRFB DETAIL

LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- MAST ARM SIGNAL POLE
- MAST ARM OR SIGNAL POLE MOUNTED SIGN
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION B

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF POLE-MOUNTED W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10 FT MOUNTING HEIGHT TO BOTTOM OF W16-7PL PLAQUE IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING BY R1-5 SIGN.
3. INSTALL RRFB TO MAST ARM USING THE CLAMP ASSEMBLY AS SHOWN ON SL 3D. EXTEND TUBE BELOW W11-2 SIGN TO INSTALL RRFB.
4. INSTALL RRFB WITH INTEGRATED PEDESTRIAN CONFIRMATION PILOT LIGHT.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE SPECIAL EMPHASIS CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER. SEE ST SERIES STD DWGS

C. PLACE YIELD LINE 4 FT FROM CROSSWALK AT INTERSECTIONS ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. PROVIDE A TYPE 0 SIGNAL HEAD CENTERED OVER EACH THRU LANE, FOR MULTIPLE THRU LANE APPROACHES. PROVIDE W11-2 SIGNS CENTERED BETWEEN ALL TYPE 0 SIGNAL HEADS.

CENTER W11-2 SIGN IN THE THRU LANE AND PROVIDE TWO TYPE 0 SIGNAL HEADS SPACED AT LEAST 8 FT APART, FOR SINGLE THRU LANE APPROACHES.

F. DO NOT INSTALL FLASHING BEACON CROSSWALK ON ROADWAYS WITH POSTED SPEEDS GREATER THAN 45 MPH UNLESS DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

G. PLACE FLASHING BEACON ASSEMBLIES ON A SINGLE OR TWO SEPARATE MAST ARMS.

H. DO NOT INSTALL FLASHING BEACON CROSSWALK IN A REDUCED SPEED SCHOOL ZONE.

I. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

J. PLACE "NO PARKING" SIGNS TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK. NO ACCESSES ARE ALLOWED IN THIS AREA.

K. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECTANGULAR RAPID FLASHING BEACON (RRFB).

L. RRFB CAN ONLY BE USED ON NON-CONTROLLED APPROACHES.

M. DO NOT MIX FLASHING BEACON TYPES (OPTION A AND OPTION B) AT A CROSSWALK.

N. LOCATE RRFB AND SIGN ON MAST ARM CENTERED OVER THE TRAVEL LANES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/2019	JS	ADDED RRFB OPTION FOR OVERHEAD. ADDED RRFB NOTES.

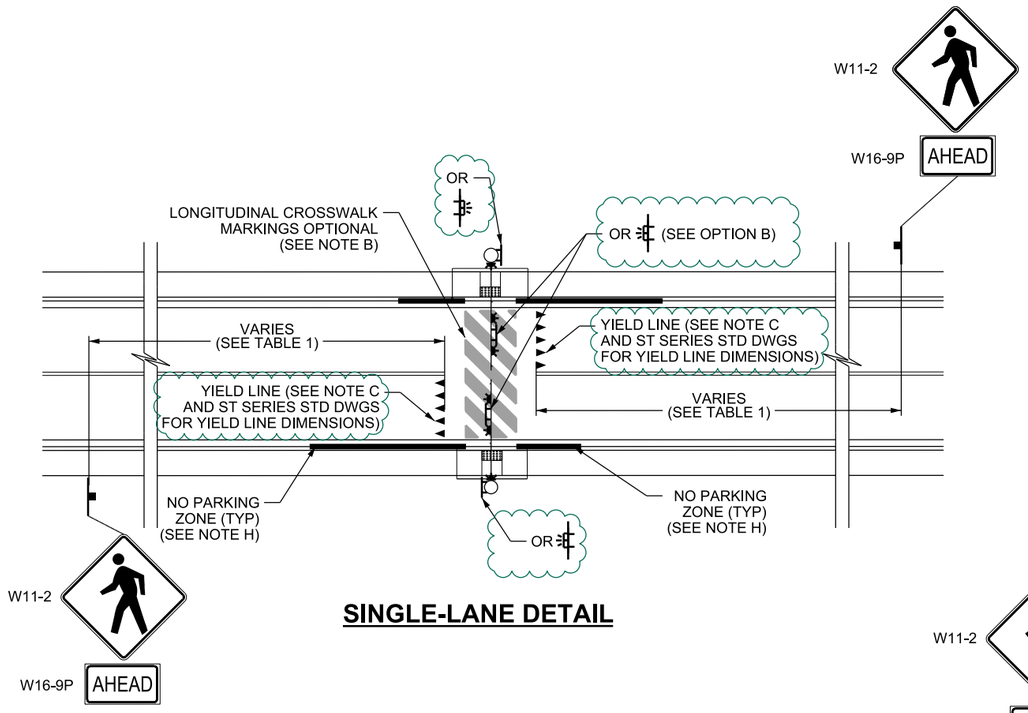
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

		DATE
RECOMMENDED FOR APPROVAL		AUG 29, 2019
CHAIRMAN STANDARDS COMMITTEE APPROVED		AUG 29, 2019
DEPUTY DIRECTOR		DATE

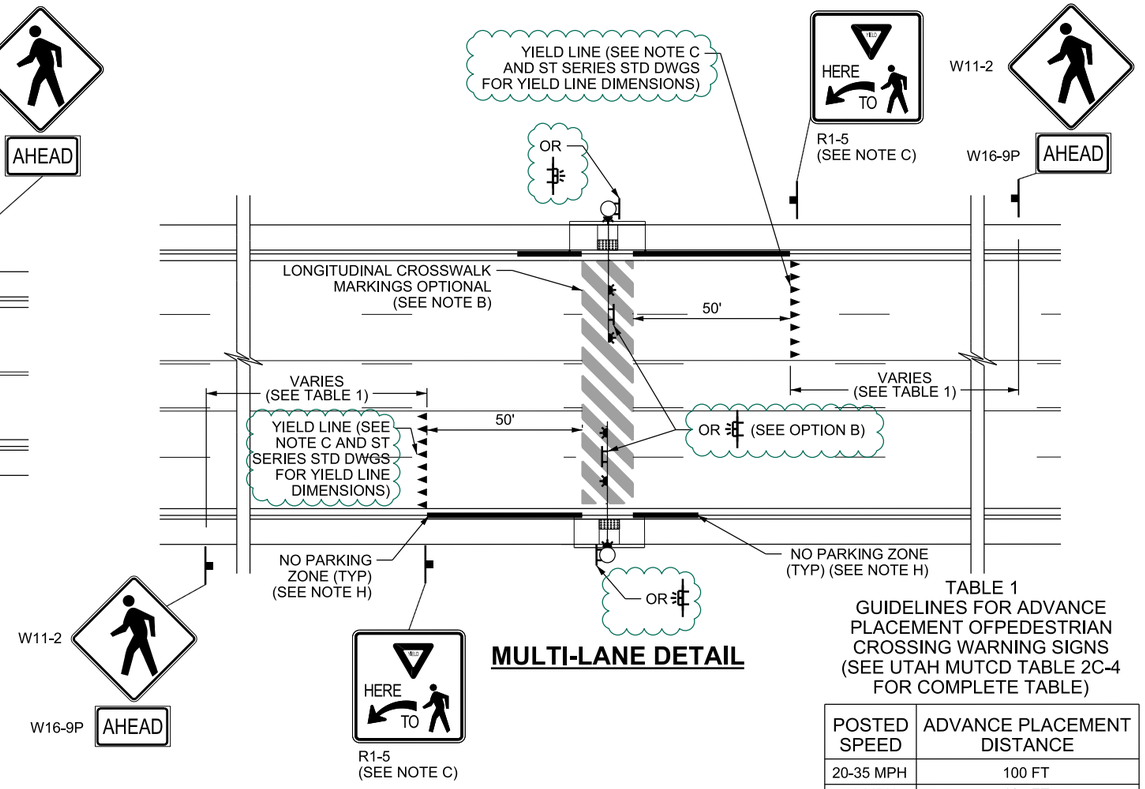
OVERHEAD FLASHING BEACON AT AN INTERSECTION CROSSWALK

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6D



SINGLE-LANE DETAIL



MULTI-LANE DETAIL

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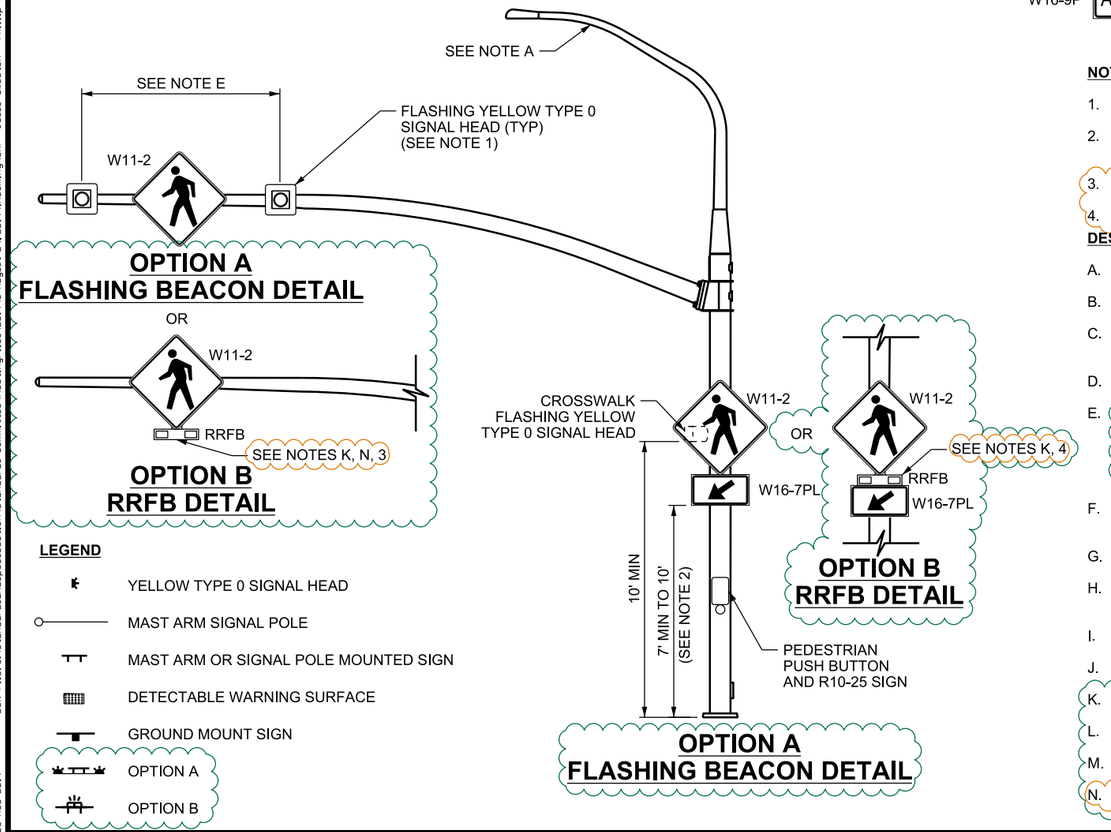

LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- MAST ARM SIGNAL POLE
- MAST ARM OR SIGNAL POLE MOUNTED SIGN
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION B

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF POLE-MOUNTED W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10 FT MOUNTING HEIGHT TO BOTTOM OF W16-7PL PLAQUE IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING BY R1-5 SIGN.
3. INSTALL RRFB TO MAST ARM USING THE CLAMP ASSEMBLY AS SHOWN ON SL 3D. EXTEND TUBE BELOW W11-2 SIGN TO INSTALL RRFB.
4. INSTALL RRFB WITH INTEGRATED PEDESTRIAN CONFIRMATION PILOT LIGHT.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE LONGITUDINAL CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

C. PLACE YIELD LINE 4 FT FROM CROSSWALK ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. PROVIDE A TYPE 0 SIGNAL HEAD CENTERED OVER EACH THRU LANE, FOR MULTIPLE THRU LANE APPROACHES. PROVIDE W11-2 SIGNS CENTERED BETWEEN ALL TYPE 0 SIGNAL HEADS.

CENTER W11-2 SIGN IN THE THRU LANE AND PROVIDE TWO TYPE 0 SIGNAL HEADS SPACED AT LEAST 8 FT APART, FOR SINGLE THRU LANE APPROACHES.

F. DO NOT INSTALL FLASHING BEACON CROSSWALK ON ROADWAYS WITH POSTED SPEEDS GREATER THAN 45 MPH UNLESS DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

G. PLACE FLASHING BEACON ASSEMBLIES ON A SINGLE OR TWO SEPARATE MAST ARMS.

H. PLACE "NO PARKING SIGNS" TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK AND 20 FT AFTER CROSSWALK FOR EACH APPROACH. NO ACCESSES ARE ALLOWED IN THIS AREA.

I. DO NOT INSTALL FLASHING BEACON CROSSWALK WITHIN A REDUCED SPEED SCHOOL ZONE.

J. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

K. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECANGULAR RAPID FLASHING BEACON (RRFB).

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N. LOCATE RRFB AND SIGN ON MAST ARM CENTERED OVER THE TRAVEL LANES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/2019	JS	ADDED RRFB OPTION FOR OVERHEAD. ADDED RRFB NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 29, 2019 — DATE

DEPUTY DIRECTOR

OVERHEAD FLASHING BEACON AT A MIDBLOCK CROSSWALK

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6F

Standards Committee Submittal Sheet

Name of Preparer: Tiffany Pocock

Title/Position of Preparer: Preconstruction Design Engineer

Specification/Drawing/Item Title: Striping (ST) Series Standard Drawings

Specification/Drawing Number: All ST Series Standard Drawings; GW 1A, GW 7A, PA 6, RR 6, RR 7, SL 6E, SL 6G

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date.
   (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

A large amount of designer only information resides in the ST Series construction standard drawings. The proposed changes to the ST Series standard drawings are to remove the designer only information out of the construction standards and into the UDOT design manuals. Other standard drawings that have references to the ST standard drawings have been updated as well due to the information being moved to a different location. The proposed changes are not to significantly change the existing designer information but to incorporate it into the UDOT Roadway Design Manual (RDM).

ST Drawings being deleted: ST 2 – 7, 8 (renumbered to ST 2), 9 (renumbered to ST 3), 10 – 18
New ST Drawings created: ST 1, 2 and 3.

GW 7A was updated to show standard delineator application for lane reduction transitions. This information is currently shown in the ST Series. All other delineator construction standards reside in the GW Series. To maintain a single location where delineator standards are found, this information for lane reductions was added to GW 7A instead of being incorporated into the RDM.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
The proposed changes do not affect any standard UDOT pay items, Measurement and Payment will not need to be updated

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to “Standards Committee Members” for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

4. What additional systems and documents need modification to reflect this change?

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).
This change does not affect the cost of projects, the change is the location of where information is located.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).
Operational costs will not be affected.

3. Life cycle cost.
Life cycle costs will not be affected.

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**
Costs will not impacted. The benefit of the change is part of the effort to remove all of the design only information out of the construction standard drawings and into the design manuals.

H. Safety Impacts?
None

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

Priority Explanation

Enter the appropriate priority in the box on the first page of the document.

Review Standards Committee Policy 08A-05 and related Procedure 08A5-01.5 prior to determining the Priority.

Priority 1 Upon posting, this impacts all projects in construction and design with a Change Order, Addenda, and immediate change to projects being advertised.

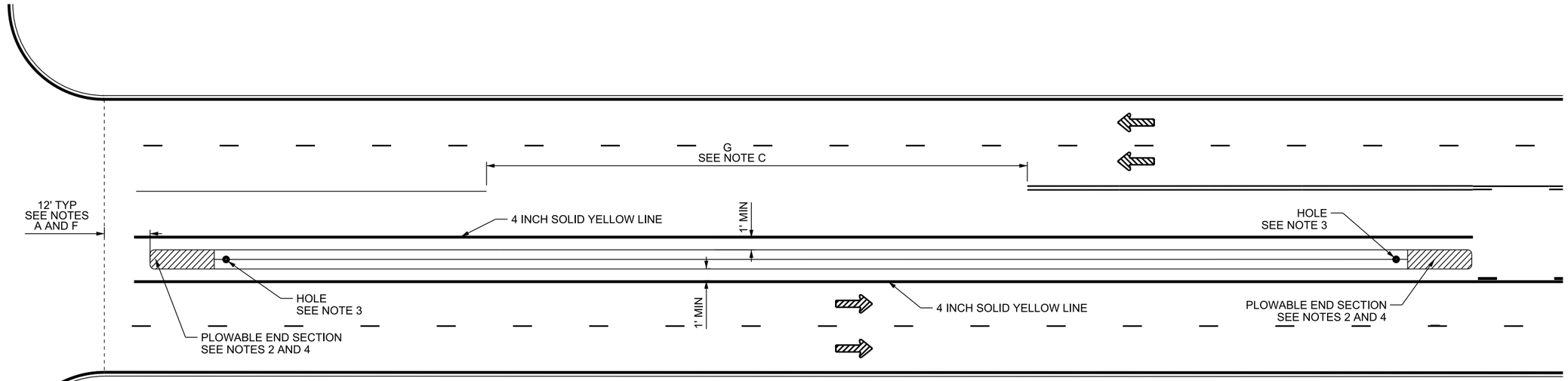
Priority 2 Upon posting, this impacts projects being advertised.

Priority 3 Upon posting, the approved standard takes effect **four weeks** later for projects being advertised.

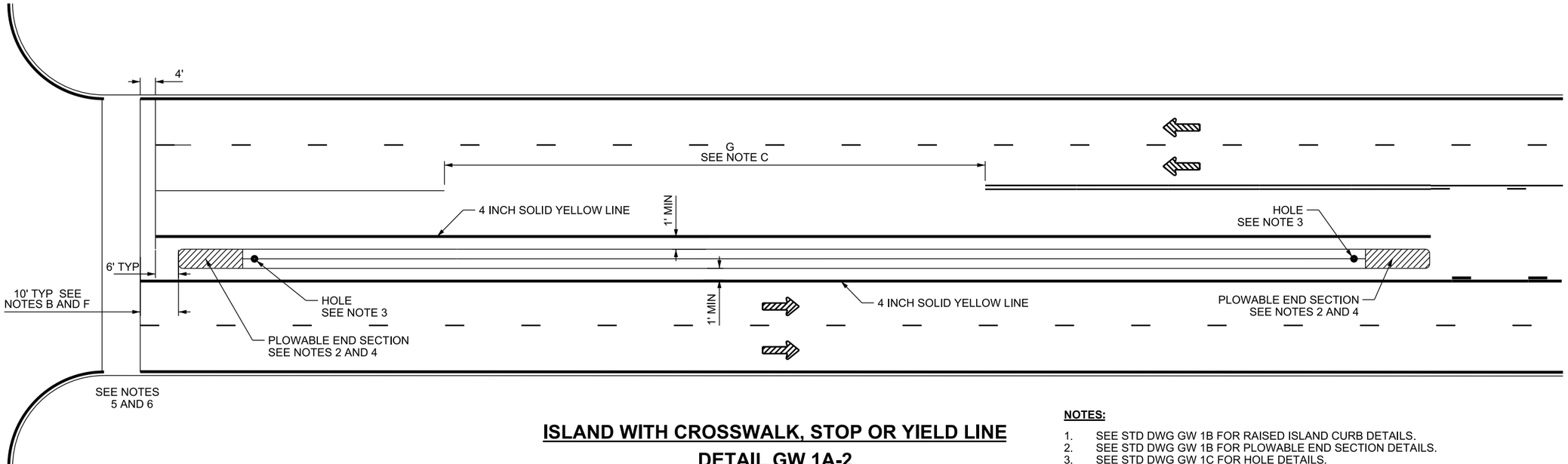
Priority 4 Applicable to a new edition of the Standards only.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
7/17/2019 10:50:55	kthornock@utah.gov	Kirk Thornock	ST Drawings	No comments.		
7/17/2019 13:31:10	Rferrin@utah.gov	Ryan Ferrin	ST Drawings	No comments		
7/18/2019 14:00:30	dpage@utah.gov	Danny Page	ST Drawings	No Comments		
7/18/2019 14:32:25	jtremaine@utah.gov	Janice	ST Drawings	No comment		
7/18/2019 17:32:11	michaeladams@utah.gov	Michael A. Adams	ST Drawing Series	No Comment		
7/19/2019 10:46:24	shawnlambert@utah.gov	Shawn Lambert	ST02	As we implement 6" lines on some of our roads, we may want to add that option into this drawing.	When they are implemented we will update this drawing and many others that show striping widths. May add confusion if it is added before the 6 inch lines are implemented.	Tiffany Pocock
7/19/2019 14:32:08	dfriant@utah.gov	Daryl Friant	ST Drawings	No Comments		
7/25/2019 13:10:12	vliu@utah.gov	Vincent Liu	Drawings	Make consistent unit callouts, ex: FT vs '	Callouts are consistent	Tiffany Pocock
7/25/2019 14:23:44	Roland.Stanger@dot.gov	FHWA	ST 1	Since the School Markings ST DWG is referenced in Part 7 of the UMUTCD for all public roads, adding the HOV, Parallel Parking and Special Emphasis details could be confusing to locals who must use the drawing. These locals include public works dir, city engineers, maintenance, law enforcement and even elected officials , so keeping the school drawings simple and clear should help the locals establish their school zones. The Special Emphasis markings are prohibited from being used as a school crosswalk so showing them on school marking drawing will be confusing. Recommend removing the HOV, Parallel Parking and Special Emphasis details with associated notes to a separate drawing. Also consider copying the Stop or Signal Control and Yield Control Details to the new drawing with standard crosswalk markings instead of the school crosswalk markings, thus distinguishing the uniqueness of the school markings. Recommend keeping the Old Notes 5 (Red curb markings) and 6 (9 ft wide crosswalks) as reminders for the locals. The UMUTCD Part 7 standard is 9 ft wide crosswalks, whereas UDOT has maintained the 10 ft.	Separated out the school information into its own drawing just like it was before, the new drawing is now ST 2. Added the old notes 5 and 6 back into the drawing	Tiffany Pocock
7/29/2019 17:11:27	fdoehring@utah.gov	Fred Doehring	All	No comments		
7/30/2019 9:14:30	kbarrett@utah.gov	Kelly Barrett	ST Group	Nothing of concern		
7/31/2019 7:39:59	dlahusen@avenueconsultants.com	ACEC	ST and Related	No Comment		
7/31/2019 11:31:53	brettslater@utah.gov	brettslater	ST Drawings	No Comment		
7/31/2019 21:11:05	raycook@utah.gov	Ray Cook	All	Revisions text size is way too small. Use standard text size similar to other revisions.	Updated size of the text to medium	Tiffany Pocock
7/31/2019 21:13:12	raycook@utah.gov	Ray Cook	GW-1A	Design Only Notes A and B should be Notes 5 and 6.	Agree, changed to Notes 5 and 6 and updated the references in the drawing	Tiffany Pocock
7/31/2019 21:15:18	raycook@utah.gov	Ray Cook	PA 6	Reference to RDM DM drawings in detail is obviously intended for designers, however there is no way to identify this as intended for designers as it is currently shown. Suggest to make the reference a design only note and reference the design only note from the detail.	Standard parking space is shown on ST 1, chagned reference to STD DWG ST 1 instead of RDM	Tiffany Pocock
7/31/2019 21:20:07	raycook@utah.gov	Ray Cook	ST 2	Note 2: Use the exact detail name (Background Contrast Pavement Marking Option 1). Note 3 appears to be a design note and should be deleted. If for some reason it is not a design note, change "Region Traffic Engineer" to "Engineer." Note 4 is redundant and can be deleted since the sheet title indicates that the entire sheet is for concrete pavement.	Updated note 2 to match detail name. Agree note 3 is design related and the decision is made during design and not during construction. Deleted note 4.	Tiffany Pocock
7/31/2019 21:21:50	raycook@utah.gov	Ray Cook	ST 2	Continuous contract pavement marking and Option 2 details are inconsistent with the Option 1 detail. (Option 1 detail uses leaders to identify the elements of the detail.) Suggest to use leaders to identify the white painted areas in all details. At the very least, the “4” at the end of line one should be moved to line two so that “4 inch dotted line . . .” is together.	Leaders get lost in the black paint, moved the "4" down to the second line	Tiffany Pocock

8/1/2019 9:39:07	cmason-hill@utah.gov	Charles Mason-Hill	ST-01	Note 5 - Should this read Directed by the Engineer or Region Traffic Engineer? Currently it just states the need for a deviation from standards in a different way. If that is the intent then I would say the second line is not needed.	Agree the second line is not needed, standard is 32 inches. (Note 5 is now Note 1 on ST 1)	Tiffany Pocock
8/1/2019 13:16:15	betty@wadsco.com	AGC/Betty Purdie	General	Overall - as previously discussed, I disagree with UDOT's approach of removing all design related information from the standard drawings. It will cause problems with work being done incorrectly, or delays while waiting for answers that used to be easily addressed by looking at the standard drawings. I would hope that UDOT doesn't intend for construction to now have to use the design manual to help clarify issues. General: many of the details assist in making sure striping is placed correctly I have often found that the plans do not fully detail the striping - are missing stations, start stop points, arrows, etc.... ST 2 useful if overlaying road with passing lanes and striping needs to be corrected - don't have plans for orange books. ST10 & 11 & 12- on the new drawings you have kept school message layout information, but have not kept bicycle message details.....will this always be added as a project specific detail now? ST 15-18 - same questions about HOV striping requirements - will now be details added to each project needing them?	Thank you for the comment and we appreciate the concern. the Department is committed to making sure that all necessary information is in the plan set. If it is not, the RE will have to use the Design Manual for information on how to design the striping. Robert Stewart will contact you to discuss further.	Tiffany Pocock
8/6/2019 17:03:37	dfriant@utah.gov	Daryl Friant	ST Drawings	No Comments		



ISLAND WITHOUT CROSSWALK, STOP OR YIELD LINE
DETAIL GW 1A-1



ISLAND WITH CROSSWALK, STOP OR YIELD LINE
DETAIL GW 1A-2

NOTES:

1. SEE STD DWG GW 1B FOR RAISED ISLAND CURB DETAILS.
2. SEE STD DWG GW 1B FOR PLOWABLE END SECTION DETAILS.
3. SEE STD DWG GW 1C FOR HOLE DETAILS.
4. PAINT PLOWABLE END SECTION TO MATCH ADJACENT EDGE LINE.
5. SEE STD DWG ST 1 FOR STANDARD CROSSWALK, STOP AND YIELD LINE MARKINGS.
6. SEE STD DWG ST 1 FOR SCHOOL CROSSWALK, STOP AND YIELD LINE MARKINGS.

DESIGN ONLY NOTES:

A. PLACE ISLAND IN RELATION TO PC/PT OF CURB SHOULDER.
B. PLACE ISLAND IN RELATION TO CROSSWALK, STOP OR YIELD LINE.
C. SEE UDOT ROADWAY DESIGN MANUAL DM DRAWINGS FOR GAP LENGTH.
D. LENGTH OF ISLAND DETERMINED BY REGION TRAFFIC ENGINEER.
E. SEE UDOT ROADWAY DESIGN MANUAL DM DRAWINGS FOR PAVEMENT MARKING DETAILS.
F. SETBACK FOR BEGINNING OF PLOWABLE END SECTION MAY INCREASE FOR SITE SPECIFIC APPLICATIONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	REVISED REFERENCES FOR THE ST SERIES STANDARD DRAWINGS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

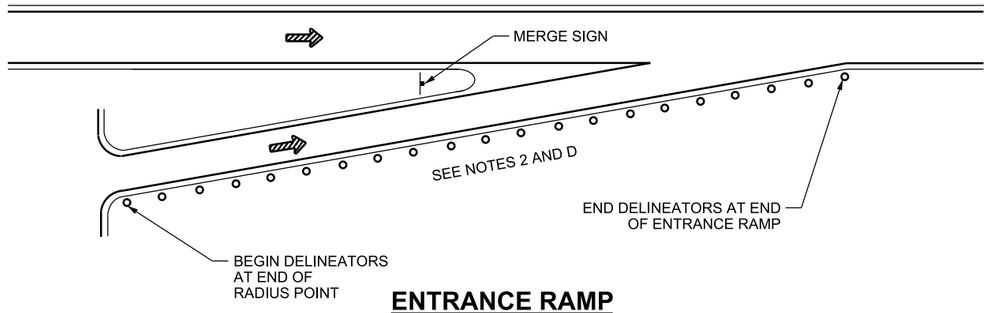
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

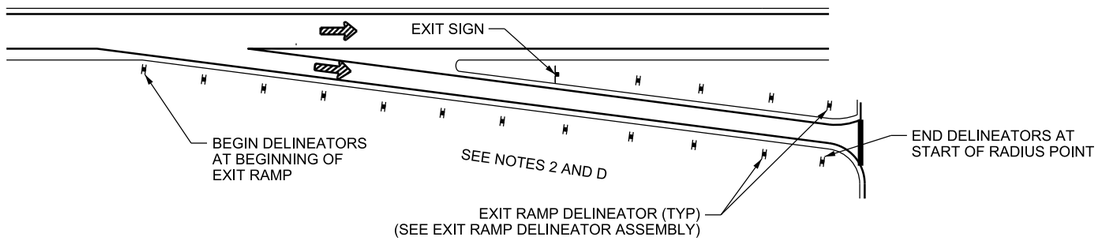
STANDARD DRAWING TITLE
RAISED ISLAND

STD. DWG. NO.
GW 1A

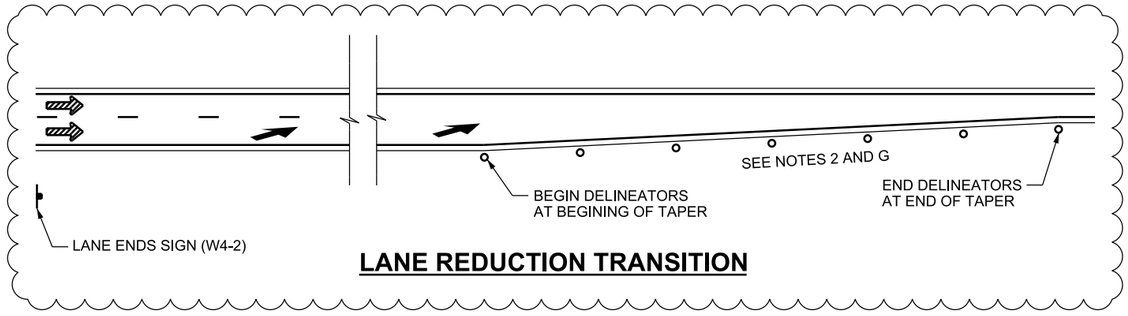
DGN File: D:\Standards\StandardSpecsSection\Standards Committee\MeetingFiles\2019\15-August 29, 2019\Incoming\Design - Tiffany Pocock\3-AgendaVersion\GW01A.DGN
08-AUG-2019



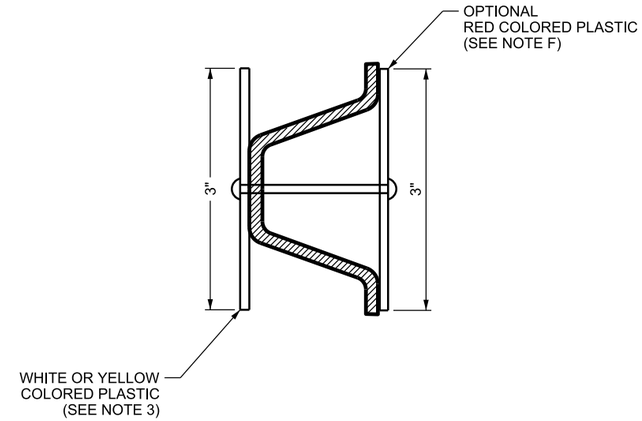
ENTRANCE RAMP



EXIT RAMP

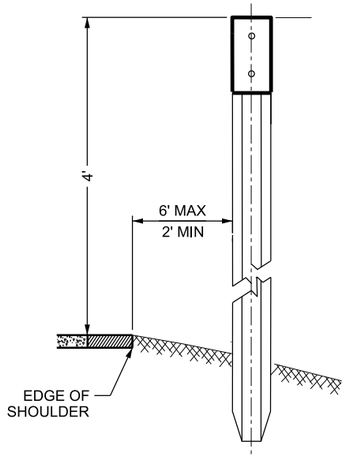


LANE REDUCTION TRANSITION

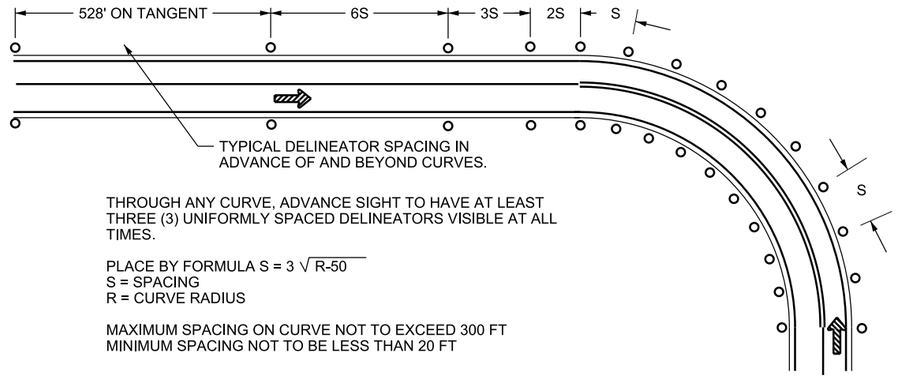


EXIT RAMP DELINEATOR ASSEMBLY

USE FOR 2 LB/FT POST WITH COLORED PLASTIC ATTACHED



DELINEATOR

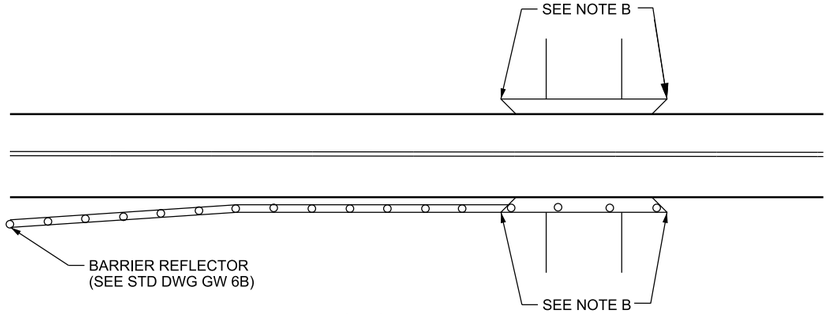


THROUGH ANY CURVE, ADVANCE SIGHT TO HAVE AT LEAST THREE (3) UNIFORMLY SPACED DELINEATORS VISIBLE AT ALL TIMES.

PLACE BY FORMULA $S = 3\sqrt{R-50}$
S = SPACING
R = CURVE RADIUS

MAXIMUM SPACING ON CURVE NOT TO EXCEED 300 FT
MINIMUM SPACING NOT TO BE LESS THAN 20 FT

DELINEATOR SPACING FORMULA



BARRIER REFLECTOR DETAIL

(SEE NOTE A)

NOTES:

1. BARRIERS ARE DEFINED AS BEING GUARDRAIL, CONCRETE BARRIER, AND BRIDGE PARAPET WALL.
2. USE CONSISTENT MOUNTING HEIGHT AT EACH LOCATION.
3. MATCH REFLECTOR COLOR TO THE ADJACENT PAVEMENT MARKING LINE COLOR. INSTALL THE YELLOW OR WHITE REFLECTORS ON POSTS TO FACE TRAFFIC.

DESIGN-ONLY NOTES:

A. SPACE BARRIER REFLECTORS A MAXIMUM 100 FT IN PERMANENT APPLICATIONS AND 50 FT FOR TEMPORARY APPLICATIONS. REFLECTOR COLOR TO MATCH THE ADJACENT PAVEMENT MARKING LINE.

B. INSTALL APPROPRIATE OBJECT MARKER OM3-R (OR L OR C) IN PLACE OF DELINEATOR AT LEADING EDGE OF BRIDGE PARAPET OR HEADWALL IF GUARDRAIL IS NOT PRESENT.

C. CHEVRON ALIGNMENT (W1-8) SIGNS MAY BE USED WHEN ADDITIONAL EMPHASIS AND GUIDANCE FOR A CHANGE IN HORIZONTAL ALIGNMENT IS NEEDED. THE W1-8 SIGN MAY BE USED TO SUPPLEMENT STANDARD DELINEATORS ON CURVES. THE W1-8 SIGN MAY BE USED TO SUPPLEMENT OR AS AN ALTERNATE TO THE LARGE ARROW (W1-6) SIGN. SEE STD DWG SN 7 FOR CHEVRON ALIGNMENT SIGN DETAILS.

D. SPACE TYPE II DELINEATORS AT 300 FT ON TANGENTS ALONG ALL ENTRANCE AND EXIT RAMPS AS SHOWN. USE DELINEATOR SPACING FORMULA FOR ALL RAMP CURVES.

E. USE DELINEATORS ON THE LEFT SIDE OF ENTRANCE AND EXIT RAMPS FOR RIGHT HAND CURVES UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.

F. RED REFLECTORS MAY BE INSTALLED ON BACK SIDES OF DELINEATOR POSTS IN AREAS WHERE WRONG WAY DRIVERS ARE OF CONCERN.

G. SPACE 7 TYPE I DELINEATORS EQUALLY SPACED THROUGH LENGTH OF LANE REDUCTION TAPER.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REVISIONS	REMARKS
1	8/29/19	MRB	ADDED DELINEATOR PLACEMENT DETAIL FOR LANE REDUCTIONS	

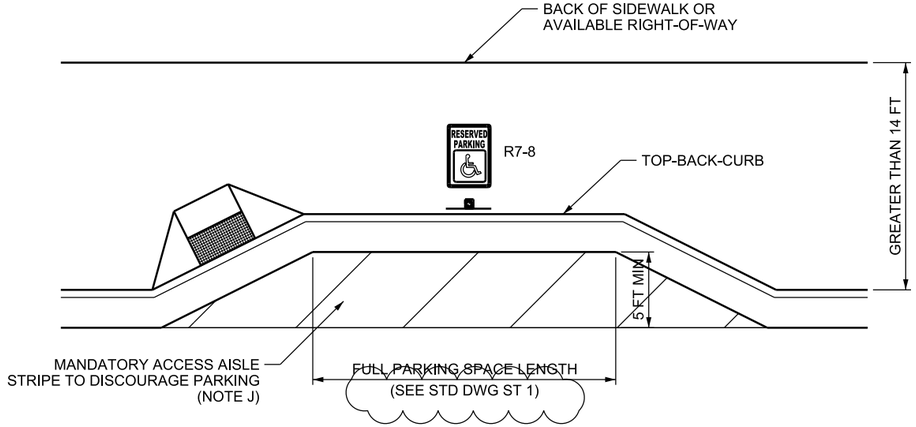
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE
DEPUTY DIRECTOR

DELINEATION APPLICATION

STANDARD DRAWING TITLE

STD. DWG. NO.
GW 7A

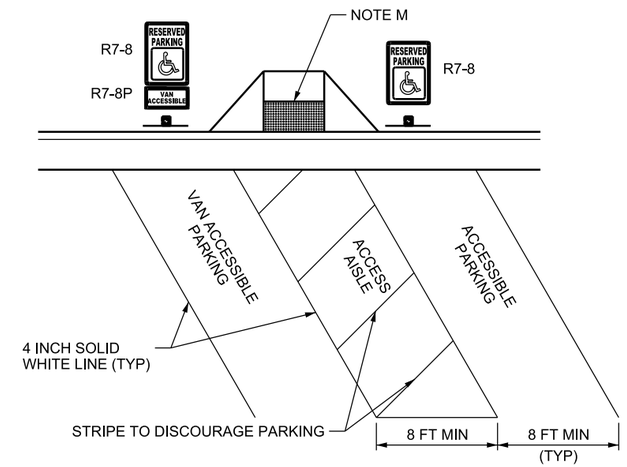


ON-STREET ACCESS AISLE

NOTES I AND J

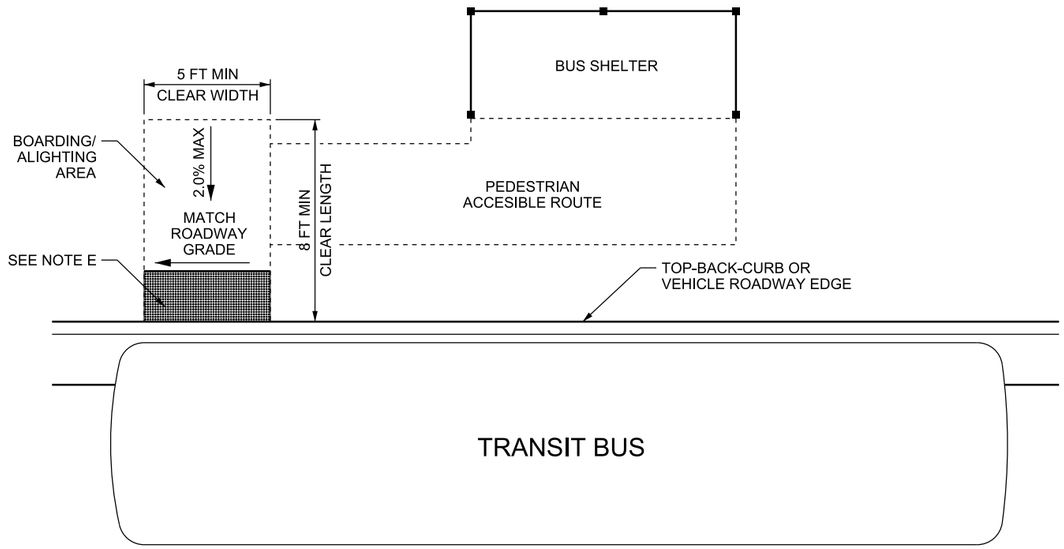
PROWAG R214

ACCESSIBLE ON-STREET PARKING	
TOTAL SPACES ON THE BLOCK PERIMETER	MIN REQUIRED ACCESSIBLE SPACES
1 TO 25	1
26 TO 50	2
51 TO 75	3
76 TO 100	4
101 TO 150	5
151 TO 200	6
OVER 200	4% OF TOTAL



RESERVED ACCESSIBLE PARKING

NOTES:
1. PROVIDE ONE VAN ACCESSIBLE STALL FOR EVERY EIGHT ACCESSIBLE STALLS.
2. REFER TO LOCAL JURISDICTION FOR NUMBER OF STALLS, ANGLE, STALL DEPTHS, MANUEVERING AISLE WIDTHS, AND ANY OTHER REQUIREMENTS.



TRANSIT SHELTER DETAIL

(BUS SHOWN FOR ILLUSTRATION, RAIL SIMILAR)
PROWAG R306

DESIGN NOTES:

A. PROVIDE A CONTINUOUS AND DETECTABLE EDGE TREATMENT ALONG THE STREET SIDE OF THE SIDEWALK AT ROUNDABOUTS, WHERE SIDEWALKS ARE FLUSH AGAINST THE CURB AND PEDESTRIAN STREET CROSSING IS NOT INTENDED. DO NOT USE DETECTABLE WARNING SURFACES FOR EDGE TREATMENT. PROVIDE A BOTTOM EDGE 15 IN MAXIMUM ABOVE THE SIDEWALK WHERE CHAINS, FENCING, OR RAILINGS ARE USED FOR EDGE TREATMENT. (PROWAG R306.3.1)

B. PROVIDE A PEDESTRIAN ACTIVATED SIGNAL FOR EACH MULTI-LANE SEGMENT OF EACH PEDESTRIAN STREET CROSSING, INCLUDING THE SPLITTER ISLAND AT ROUNDABOUTS WITH MULTI-LANE PEDESTRIAN STREET CROSSINGS. CLEARLY IDENTIFY WHICH PEDESTRIAN STREET CROSSING SEGMENT THE SIGNAL SERVES. (PROWAG R306.3.2)

C. PROVIDE PEDESTRIAN ACTIVATED SIGNALS AT PEDESTRIAN STREET CROSSINGS AT MULTI-LANE CHANNELIZED TURN LANES AT SIGNALIZED INTERSECTIONS OTHER THAN ROUNDABOUTS WITH PEDESTRIAN STREET CROSSINGS.

D. THE BOARDING AND ALIGHTING AREA CAN BE LOCATED EITHER WITHIN OR OUTSIDE OF THE SHELTER, WHERE A TRANSIT SHELTER IS PROVIDED. (PROWAG R308.1.1)

E. PLACE DETECTABLE WARNING SURFACES ON BOARDING PLATFORMS AT TRANSIT STOPS FOR BUSES AND RAIL VEHICLES WHERE THE EDGES OF THE BOARDING PLATFORM ARE NOT PROTECTED BY SCREENS OR GUARDS. (PROWAG R208)

F. COORDINATE THE HEIGHT OF VEHICLE FLOOR AND THE STATION PLATFORM SO AS TO MINIMIZE THE VERTICAL AND HORIZONTAL GAPS PER U.S.D.O.T. REGULATIONS (49 CFR PARTS 37 AND 38). (PROWAG R308.1.2.1)

G. IDENTIFY ACCESSIBLE PARKING SPACES BY SIGNS (MUTCD R7-8 SERIES). ACCESSIBLE PARKING SPACES SHOULD BE LOCATED WHERE THE STREET HAS THE LEAST CROWN AND GRADE AND CLOSE TO KEY DESTINATIONS. (PROWAG R309.1)

H. COUNT EACH 20.0 FT OF BLOCK PERIMETER WHERE PARKING IS PERMITTED AS ONE PARKING SPACE WHERE PARKING PAY STATIONS ARE PROVIDED AND THE PARKING IS NOT MARKED. (PROWAG R214)

I. DO NOT ENCROACH ON THE VEHICULAR TRAVEL LANE WITH THE ACCESS AISLE. THE ACCESS AISLE CAN BE ON EITHER THE DRIVER OR PASSENGER SIDE OF THE VEHICLE. (PROWAG R309.2.1)

J. AN ACCESS AISLE IS NOT REQUIRED WHERE:
- NO WORK IS BEING DONE ON THE STREET OR SIDEWALK ADJACENT TO THE PARKING SPACES OR
- THE WIDTH OF THE SIDEWALK OR THE AVAILABLE RIGHT-OF-WAY IS LESS THAN OR EQUAL TO 14.0 FT
LOCATE THE ACCESSIBLE PARKING SPACES AT THE END OF THE BLOCK FACE WHERE AN ACCESS AISLE IS NOT REQUIRED. (PROWAG R309.2.1.1, R309.2.2)

K. VERIFY THE SIDEWALK ADJACENT TO ACCESSIBLE PARALLEL PARKING SPACES IS FREE OF SIGNS, STREET FURNITURE, AND OTHER OBSTRUCTIONS TO PERMIT DEPLOYMENT OF A VAN SIDE-LIFT OR RAMP OR THE VEHICLE OCCUPANT TO TRANSFER TO A WHEELCHAIR OR SCOOTER. (PROWAG R309.2)

L. PROVIDE AN ACCESS AISLE 8.0 FT WIDE MINIMUM STREET LEVEL THE FULL LENGTH OF THE PARKING SPACE, CONNECTED TO A PEDESTRIAN ACCESS ROUTE MARK SO AS TO DISCOURAGE PARKING IN THE ACCESS AISLE WHERE PERPENDICULAR OR ANGLED PARKING IS USED. TWO PARKING SPACES ARE PERMITTED TO SHARE A COMMON ACCESS AISLE. CONNECT THE ACCESS AISLE TO THE PEDESTRIAN ACCESS ROUTE WITH CURB RAMPS OR BLENDED TRANSITIONS. DO NOT LOCATE CURB RAMPS WITHIN THE ACCESS AISLE. (PROWAG R309.3, R309.4)

M. DETECTABLE WARNING SURFACES ARE NOT REQUIRED ON CURB RAMPS AND BLENDED TRANSITIONS THAT CONNECT THE ACCESS AISLE TO THE SIDEWALK, INCLUDING WHERE THE SIDEWALK IS AT THE SAME LEVEL AS THE PARKING SPACES, UNLESS THE CURB RAMPS AND BLENDED TRANSITIONS ALSO SERVE PEDESTRIAN STREET CROSSINGS. (PROWAG R309.4)

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	NEW DRAWING
2	8/29/19	MRB	REVISED REFERENCE TO ST DRAWING

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

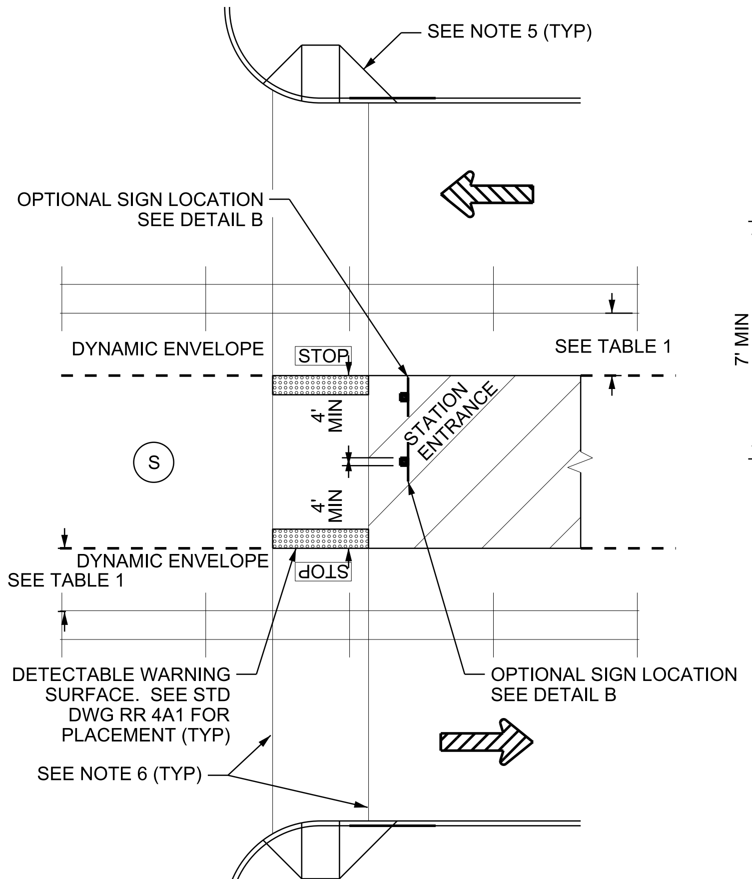
DEPUTY DIRECTOR

ROUNDABOUT, TRANSIT SHELTER, AND ON-STREET PARKING

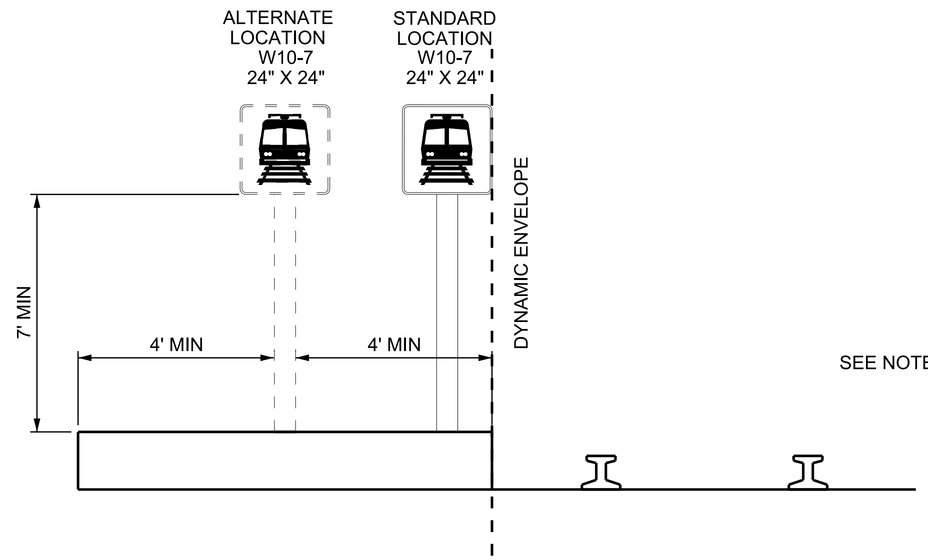
STANDARD DRAWING TITLE

STD. DWG. NO.

PA 6

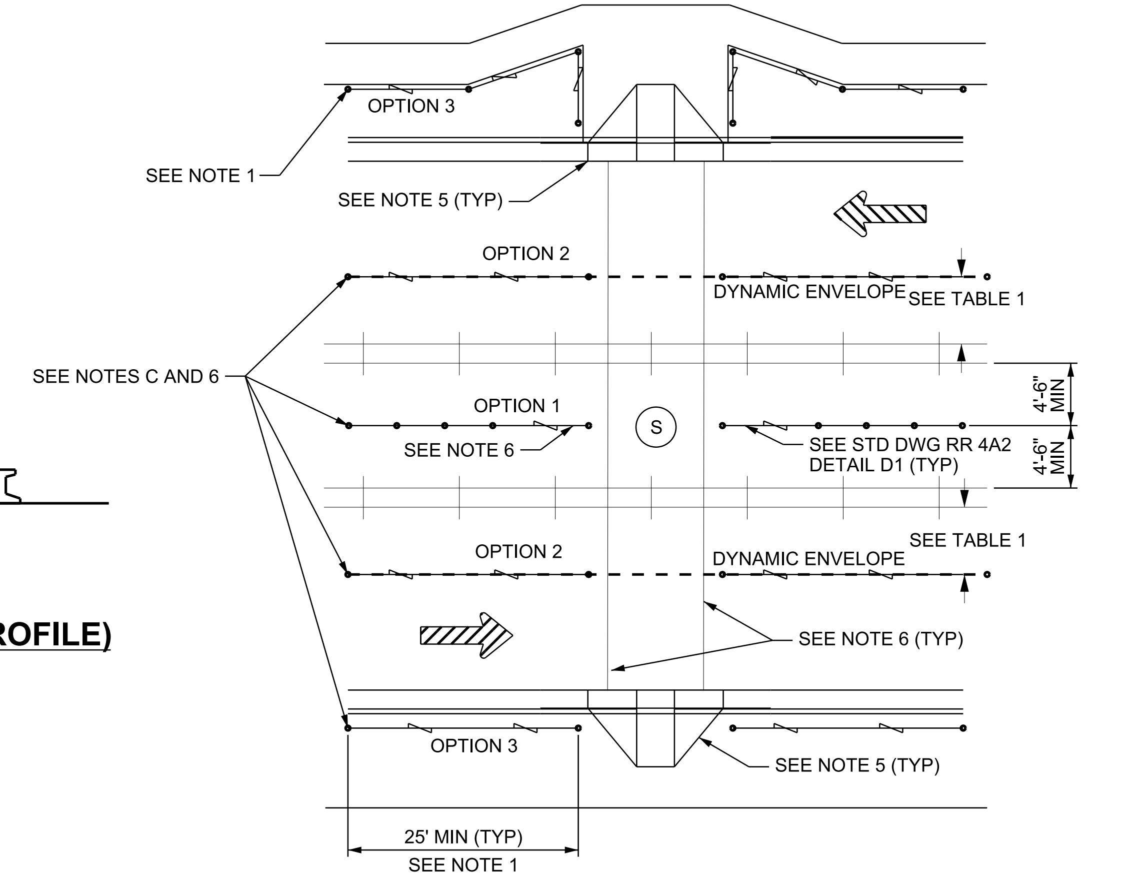


BLANK-OUT SIGNS AT STATION ENTRANCES (PLAN) DETAIL A



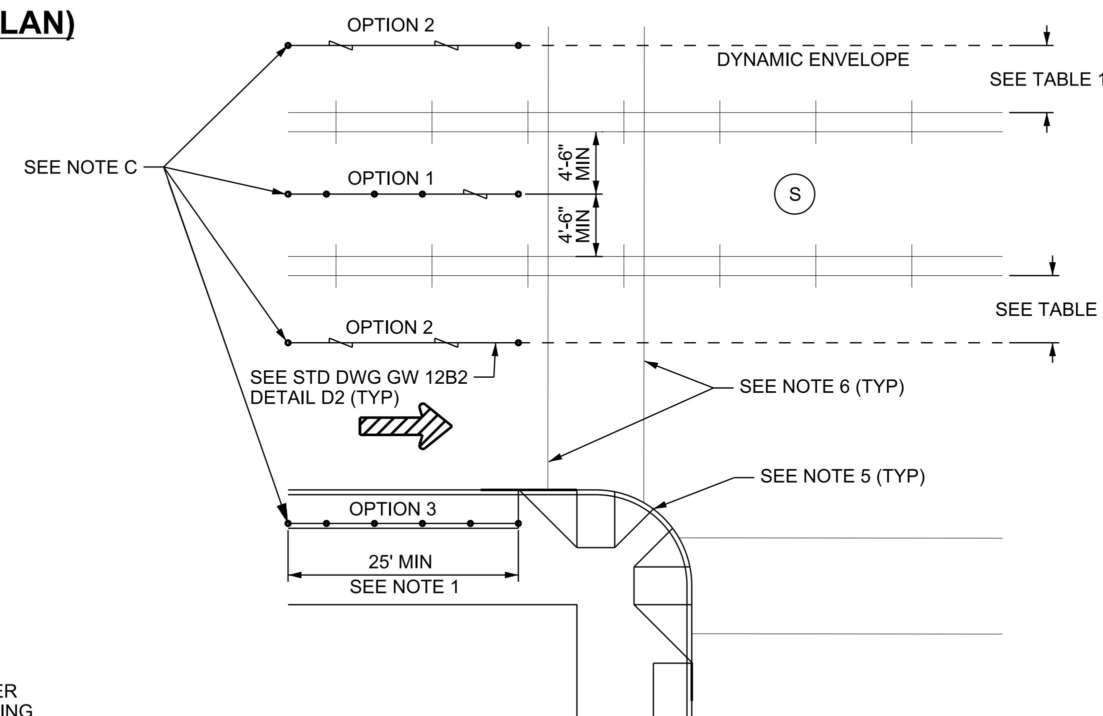
BLANK-OUT SIGN AT STATION ENTRANCE (PROFILE) DETAIL B

SEE NOTE B



MID-BLOCK CROSSINGS STREET RUNNING ALIGNMENTS DETAIL C

SEE NOTE 1



INTERSECTIONS STREET RUNNING ALIGNMENTS DETAIL D

TABLE 1	
DYNAMIC ENVELOPE WIDTH	
VEHICLE TYPE	WIDTH*
LIGHT RAIL/TROLLEY ONLY	4'-6"
SHARED USE	6'-0"
HEAVY RAIL	6'-0"

* MEASURED FROM EDGE OF NEAREST RAIL

LEGEND:

CHANNELIZING FENCE/BARRIER OR CHANNELIZING LANDSCAPING SEE STD DWG GW RR 4A2 DETAILS D1, D2, AND E

CHANNELIZING FENCE/BARRIER SEE STD DWG GW RR 4A2 DETAILS D1 AND D2

(S) SIGNALIZED INTERSECTION

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. PLACE A W10-7 BLANK-OUT SIGN IN THE ALTERNATE LOCATION ONLY IF THE 4 FT MINIMUM CLEARANCE CAN BE PROVIDED TO EITHER SIDE OF THE SIGN.

C. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.

D. PROVIDE DENSE LANDSCAPING WHEN USED IN PLACE OF CHANNELIZING FENCING OR BARRIER TO RESTRICT PEDESTRIANS FROM USING LOCATIONS OTHER THAN PEDESTRIAN ACCESSES.

NOTES:

1. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.
2. DO NOT OBSTRUCT SIGHT DISTANCE WITH FENCING OR BARRIERS. USE A CHANNELIZING FENCE OR BARRIER WITH A MINIMUM HEIGHT OF 42 INCHES AND A MAXIMUM HEIGHT OF 43 INCHES WHEN NEAR GRADE CROSSINGS.
3. ADJUST CHANNELIZATION AND BARRIER LAYOUT FROM THE LAYOUT SHOWN ON THIS DRAWING AS NECESSARY BASED ON SITE SPECIFIC SITUATIONS WHILE MAINTAINING COMPLIANCE WITH THE MINIMUMS SHOWN.
4. PLACE THE DETECTABLE WARNING SURFACE ACCORDING TO STD DWG RR 4A1, DETAILS A AND B, FOR LOCATIONS OTHER THAN AUTOMATIC VEHICLE GATES OR ROADWAY AND PEDESTRIAN FLASHING-LIGHT SIGNALS.
5. REFER TO PA SERIES STD DWGS FOR PEDESTRIAN RAMP DETAILS.
6. REFER TO ST SERIES STD DWGS FOR CROSSWALK MARKING DETAILS.

SUPPLEMENTAL DRAWING

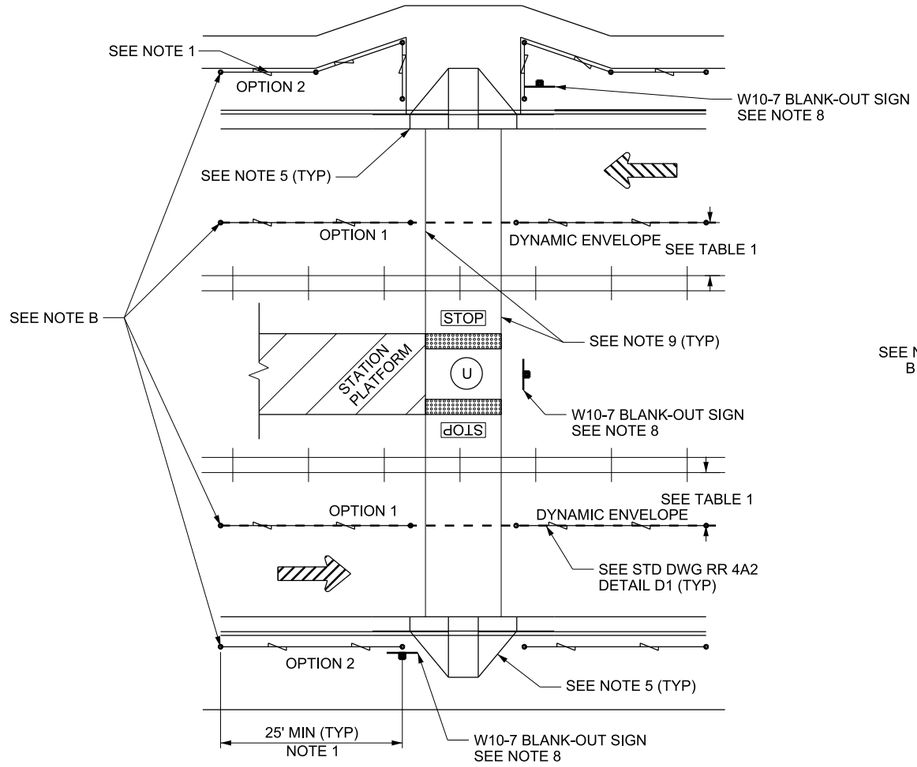
REVISIONS			
NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	UPDATED REFERENCES FOR THE ST STD DWGS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG.29,2019 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR — AUG.29,2019 DATE

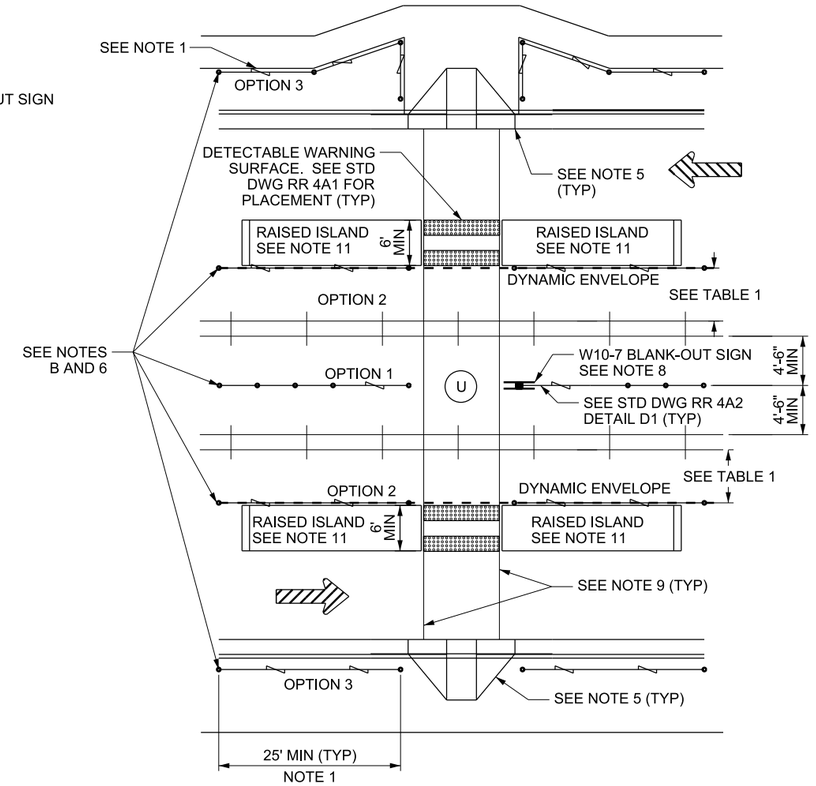
PEDESTRIAN CONTROLS STREET RUNNING RAILROAD ALIGNMENT SIGNALIZED INTERSECTIONS
STANDARD DRAWING TITLE

STD. DWG. NO.
RR 6



MID-BLOCK STATION ACCESS STREET RUNNING ALIGNMENTS DETAIL A

SEE NOTE 1



MID-BLOCK CROSSINGS STREET RUNNING ALIGNMENTS DETAIL B

SEE NOTE 1

TABLE 1	
DYNAMIC ENVELOPE WIDTH	
VEHICLE TYPE	WIDTH*
LIGHT RAIL/TROLLEY ONLY	4'-6"
SHARED USE	6'-0"
HEAVY RAIL	6'-0"

* MEASURED FROM EDGE OF NEAREST RAIL

LEGEND:

- CHANNELIZING FENCE/BARRIER OR CHANNELIZING LANDSCAPING SEE STD DWG RR 4A2 DETAILS D1, D2, AND E
- CHANNELIZING FENCE/BARRIER SEE STD DWG RR 4A2 DETAILS D1 AND D2
- (U) UNSIGNALIZED INTERSECTION

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. PLACE CHANNELIZING FENCE OR BARRIER WHEN USED ACCORDING TO OPTION 1 UNLESS SITE SPECIFIC CONDITIONS SUCH AS RIGHT-OF-WAY AVAILABILITY, CHANNELIZATION TYPE, OR SIGHT DISTANCE REQUIRE ALTERNATE PLACEMENT. CONSTRUCT FENCING A MINIMUM OF 25 FT PARALLEL TO THE TRACKS.

C. PROVIDE DENSE LANDSCAPING WHEN USED IN PLACE OF CHANNELIZING FENCING OR BARRIER TO RESTRICT PEDESTRIANS FROM USING LOCATIONS OTHER THAN PEDESTRIAN ACCESSES.

NOTES:

1. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.
2. DO NOT OBSTRUCT SIGHT DISTANCE WITH FENCING OR BARRIERS. USE A CHANNELIZING FENCE OR BARRIER WITH A MINIMUM HEIGHT OF 42 INCHES AND A MAXIMUM HEIGHT OF 43 INCHES WHEN NEAR GRADE CROSSINGS.
3. ADJUST CHANNELIZATION AND BARRIER LAYOUT FROM THE LAYOUT SHOWN ON THIS DRAWING AS NECESSARY BASED ON SITE SPECIFIC SITUATIONS WHILE MAINTAINING COMPLIANCE WITH THE MINIMUMS SHOWN.
4. PLACE THE DETECTABLE WARNING SURFACE ACCORDING TO STD DWG RR 4A1, DETAILS A AND B, FOR LOCATIONS OTHER THAN AUTOMATIC VEHICLE GATES OR ROADWAY OR PEDESTRIAN FLASHING-LIGHT SIGNALS.
5. SEE PA SERIES STD DWGS FOR PEDESTRIAN RAMP DETAILS.
6. INSTALL CHANNELIZING FENCE OR BARRIER WITH A LOOK (R15-8) SIGN ACCORDING TO STD DWG RR 4A2 DETAIL D1 UNLESS SIGHT DISTANCE RESTRICTIONS NECESSITATE W10-7 BLANK-OUT SIGNS. REPLACE R15-8 LOOK SIGNS WITH W10-7 BLANK-OUT SIGNS, IF REQUIRED.
7. INSTALL CHANNELIZING FENCE OR BARRIER WITH A LOOK (R15-8) SIGN ACCORDING TO STD DWG RR 4A2 DETAIL D2 UNLESS SIGHT DISTANCE RESTRICTIONS NECESSITATE W10-7 BLANK-OUT SIGNS. INSTALL CHANNELIZING FENCE OR BARRIER ACCORDING TO DETAIL A ON THIS SHEET IF BLANK-OUT SIGNS ARE REQUIRED.
8. INSTALL W10-7 BLANK-OUT SIGN ACCORDING TO STD DWG RR 3A1, DETAIL B.
9. SEE ST SERIES STD DWGS FOR CROSSWALK MARKING DETAILS.
10. SEE STD DWG PA 2, MEDIAN BREAK EXAMPLE, FOR PEDESTRIAN REFUGE DETAILS.
11. SEE STD DWG GW 1B FOR RAISED ISLAND AND PLOWABLE END SECTION DETAILS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	UPDATED REFERENCES FOR THE ST STD DWGS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

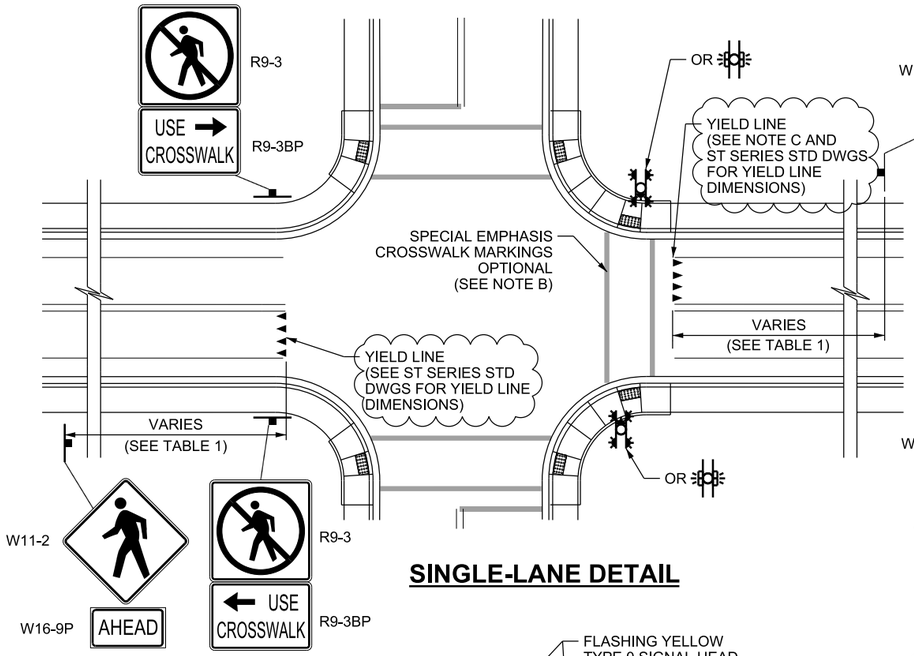
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

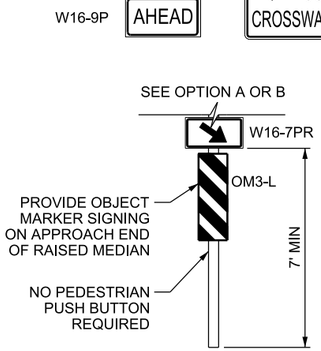
PEDESTRIAN CONTROLS
STREET RUNNING
RAILROAD ALIGNMENT
UNSIGNALIZED
INTERSECTIONS

STANDARD DRAWING TITLE

STD. DWG. NO.
RR 7

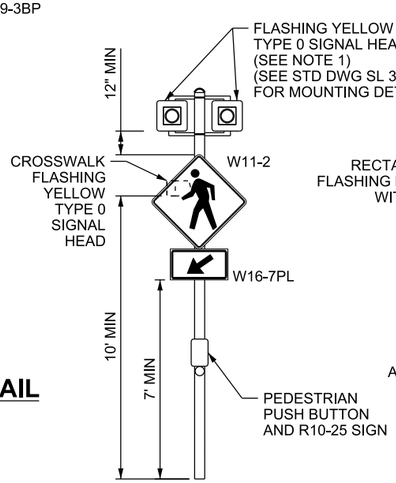


SINGLE-LANE DETAIL



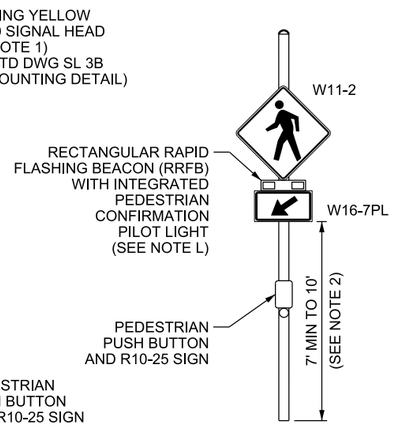
MEDIAN BEACON DETAIL

15 FT TRAFFIC SIGNAL POLE / LUMINAIRE POLE (SEE NOTES A, J, K, AND STD DWG SL 1E)



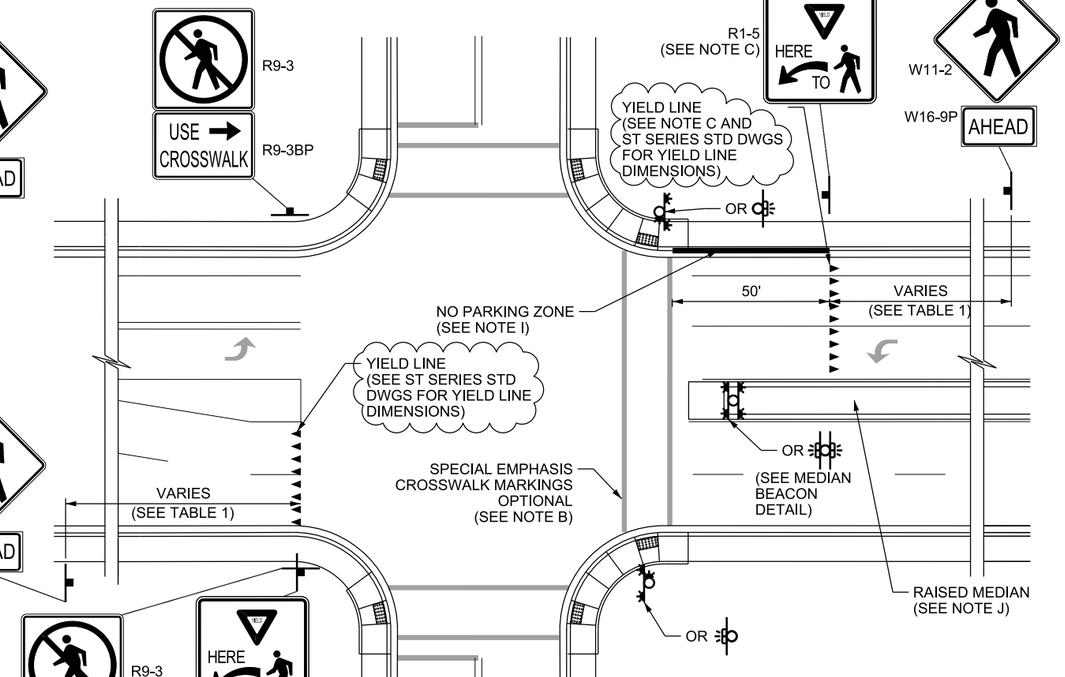
OPTION A FLASHING BEACON DETAIL

15 FT TRAFFIC SIGNAL POLE / LUMINAIRE POLE (SEE NOTES A, H AND STD DWG SL 1E)



OPTION B RRFB DETAIL

15 FT TRAFFIC SIGNAL POLE / LUMINAIRE POLE (SEE NOTES A, H, AND STD DWG SL 1E)



MULTI-LANE DETAIL

LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION A: BACK-TO-BACK (SEE NOTE K)
- OPTION B
- OPTION B: BACK-TO-BACK (SEE NOTE K)

TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH (SEE NOTE E)	125 FT

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10-FT TO BOTTOM OF SIGN MOUNTING HEIGHT FOR OPTION B ON OUTSIDE SHOULDER IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING FROM R1-5 SIGN.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE SPECIAL EMPHASIS CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER. SEE ST SERIES STD DWGS.

C. PLACE YIELD LINE 4 FT FROM CROSSWALK AT INTERSECTIONS ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. DO NOT USE POST-MOUNTED FLASHING BEACON CROSSWALK WHEN POSTED SPEED EXCEEDS 35 MPH UNLESS OTHERWISE DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

F. DO NOT INSTALL FLASHING BEACON CROSSWALK WITHIN A REDUCED SPEED SCHOOL ZONE.

G. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

H. DO NOT INSTALL POST-MOUNTED FLASHING BEACONS WHERE THERE ARE FOUR OR MORE LANES, INCLUDING TURNING LANES, IN ONE DIRECTION.

I. PLACE "NO PARKING" SIGNS TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK. NO ACCESSES ARE ALLOWED IN THIS AREA.

J. RAISED MEDIAN CONFIGURATION DETERMINED BY LOCATION NEEDS. SEE GW SERIES STD DWGS. MEET LATERAL OFFSET REQUIREMENTS.

K. BACK-TO-BACK CONSISTS OF W11-2 AND W16-7PL SIGNS AND FLASHING BEACONS FACING OPPOSITE DIRECTIONS MOUNTED ON THE SAME POLE.

L. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECTANGULAR RAPID FLASHING BEACON.

M. RECTANGULAR RAPID FLASHING BEACON CAN ONLY BE USED ON NON-CONTROLLED APPROACHES.

N. DO NOT MIX POST-MOUNTED BEACON TYPES AT A CROSSWALK.

SUPPLEMENTAL DRAWING

NO.	DATE	REVISIONS	APPR.
1	2/22/18	JS UPDATED NOTES, CALLOUTS AND GRAPHICS. DELETED RRFB FROM STD DWGS.	
2	8/30/18	JS ADDED RRFB OPTION. CHANGED SINGLE LANE DETAIL TO HAVE OPTION A BACK-TO-BACK.	
3	8/29/19	MRB UPDATED REFERENCES FOR THE ST SERIES STANDARD DRAWINGS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 DATE

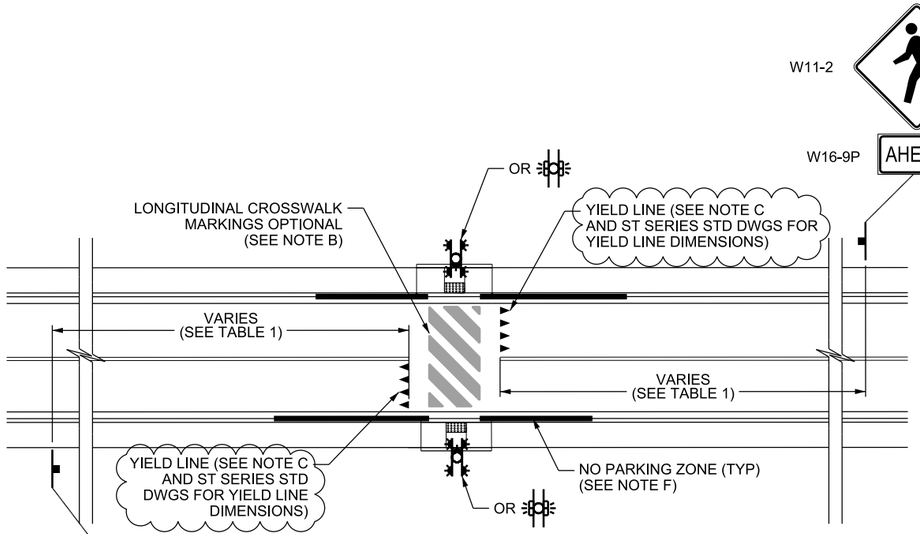
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 DATE

DEPUTY DIRECTOR

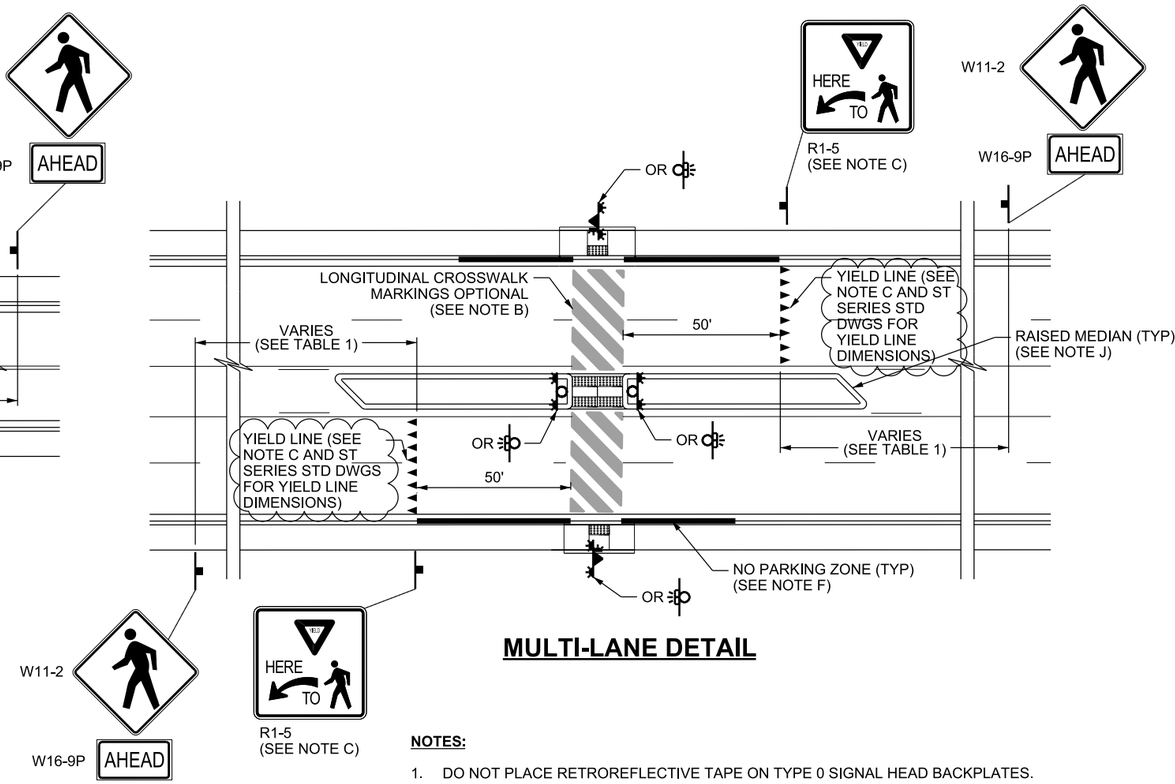
STANDARD DRAWING TITLE: POST-MOUNTED FLASHING BEACON AT AN INTERSECTION CROSSWALK

STD. DWG. NO. SL 6E

DGN File: D:\Standard and Specs Section\Standards Committee\Meeting Files\2019\5-August 29, 2019\Incoming\Design - Tiffany Pocock\13-AgendaVersion\SL06E.DGN
08-AUG-2019



SINGLE-LANE DETAIL



MULTI-LANE DETAIL

TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF
PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH (SEE NOTE E)	125 FT

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10-FT TO BOTTOM OF SIGN MOUNTING HEIGHT FOR OPTION B ON OUTSIDE SHOULDER IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING FROM R1-5 SIGN.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE LONGITUDINAL CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

C. PLACE YIELD LINE 4 FT FROM CROSSWALK ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. DO NOT USE POST-MOUNTED FLASHING BEACON CROSSWALK WHEN POSTED SPEED EXCEEDS 35 MPH UNLESS OTHERWISE DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

F. PLACE "NO PARKING" SIGNS TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK AND 20 FT AFTER CROSSWALK FOR EACH APPROACH. NO ACCESSES ARE ALLOWED IN THIS AREA.

G. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

H. DO NOT INSTALL FLASHING BEACON CROSSWALK WITHIN A REDUCED SPEED SCHOOL ZONE.

I. DO NOT INSTALL POST-MOUNTED FLASHING BEACONS WHERE THERE ARE FOUR OR MORE LANES, INCLUDING TURNING LANES, IN ONE DIRECTION.

J. RAISED MEDIAN DIMENSIONS DETERMINED BY LOCATION NEEDS. SEE GW SERIES STD DWGS. MEET LATERAL OFFSET REQUIREMENTS.

K. BACK-TO-BACK CONSISTS OF W11-2 AND W16-7P SIGNS AND FLASHING BEACONS FACING OPPOSITE DIRECTIONS MOUNTED ON THE SAME POLE.

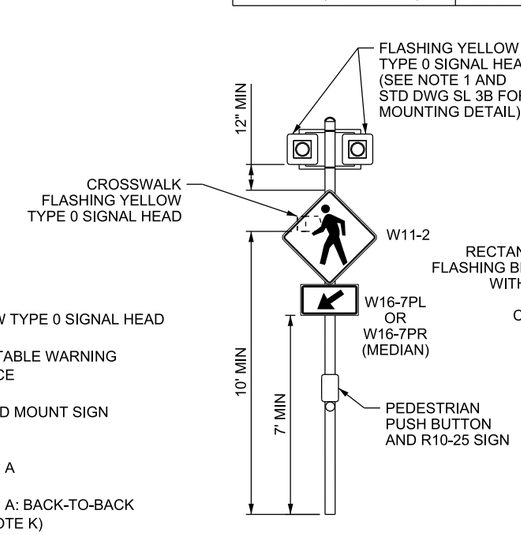
L. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECTANGULAR RAPID FLASHING BEACON.

M. RECTANGULAR RAPID FLASHING BEACONS CAN ONLY BE USED ON NON-CONTROLLED APPROACHES.

N. DO NOT MIX POST-MOUNTED BEACON TYPES AT A CROSSWALK.

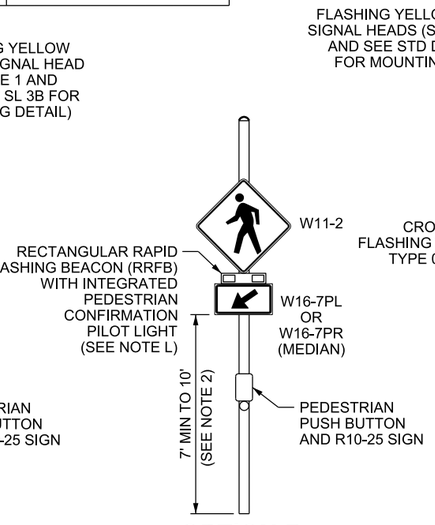
LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION A: BACK-TO-BACK (SEE NOTE K)
- OPTION B
- OPTION B: BACK-TO-BACK (SEE NOTE K)
- OPTION C



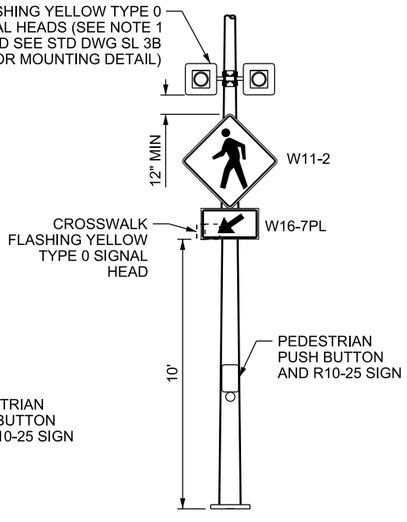
OPTION A
FLASHING BEACON DETAIL

15 FT TRAFFIC
SIGNAL POLE / LUMINAIRE POLE
(SEE NOTES A, I AND
STD DWG SL 1E)



OPTION B
RRFB DETAIL

15 FT TRAFFIC
SIGNAL POLE / LUMINAIRE POLE
(SEE NOTES A, I, AND
STD DWG SL 1E)



OPTION C
HIGH-MOUNT
FLASHING BEACON DETAIL

LUMINAIRE POLE
(SEE NOTES A, I AND
STD DWG SL 5B)

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	2/22/18	JS	REVISED CALLOUTS, NOTES AND GRAPHICS. DELETED RRFB FROM STD DWGS. DELETED YIELD LINE DISTANCE TABLE.	
2	8/30/18	JS	ADDED RRFB OPTION. CHANGED SINGLE LANE DETAIL TO HAVE OPTION A BACK-TO-BACK.	
3	8/29/19	MRB	UPDATED REFERENCES FOR THE ST SERIES STANDARD DRAWINGS	

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

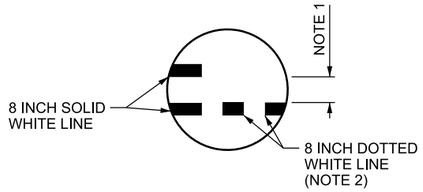
RECOMMENDED FOR APPROVAL	AUG. 29, 2019 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG. 29, 2019 DATE
DEPUTY DIRECTOR	

POST-MOUNTED FLASHING BEACON AT A MIDBLOCK CROSSWALK

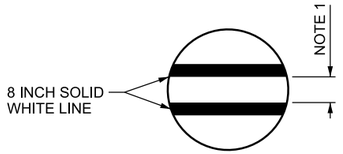
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6G

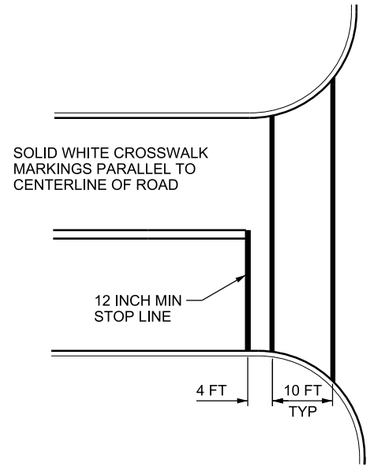
SUPPLEMENTAL DRAWING



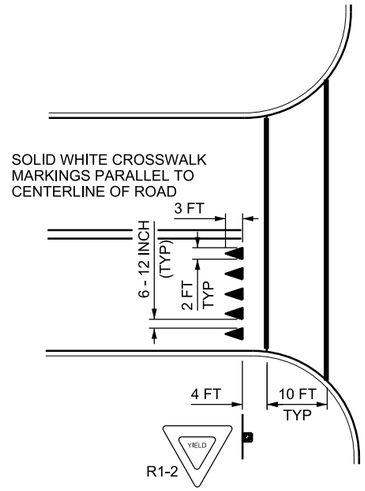
HOV LANE STRIPING DETAIL FOR TRANSITION FROM PROHIBITED MOVEMENT TO ACCESS OPENING



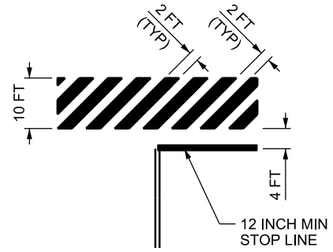
HOV LANE STRIPING DETAIL FOR PROHIBITED MOVEMENTS



STOP OR SIGNAL CONTROL

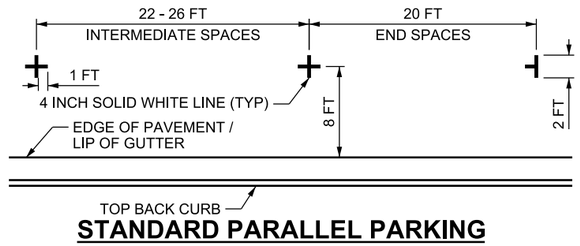


YIELD CONTROL



SPECIAL EMPHASIS CROSSWALK

SOLID WHITE DIAGONAL LINES AT 45°
TO DIRECTION OF TRAVEL



STANDARD PARALLEL PARKING

PAVEMENT MARKING LINE DIMENSIONS			
TYPE	WIDTH (INCHES)	LENGTH (FT)	GAP (FT)
SOLID LINE	4	CONTINUOUS	N/A
SOLID LINE	8	CONTINUOUS	N/A
BROKEN LINE	4	10	30
LANE DROP	8	3	9
DOTTED LINE	4	2	6
DOTTED LINE	8	2	6

NOTES:

1. USE 32 INCH (INSIDE TO INSIDE) SEPARATION BETWEEN DOUBLE SOLID WHITE LINES.
2. PLACE 8 INCH DOTTED WHITE LINE AS THE EXTENSION OF THE 8 INCH SOLID WHITE LINE ADJACENT TO THE GENERAL PURPOSE LANE.
3. MAINTAIN 4 INCH SPACE BETWEEN TWO 4 INCH SOLID YELLOW LINES OR BETWEEN 4 INCH SOLID YELLOW LINE AND 4 INCH BROKEN YELLOW LINE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	MOVED ALL DESIGNER INFORMATION TO THE UDOT RDM. DELETED ST 4 TO ST 18

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 29, 2019 — DATE

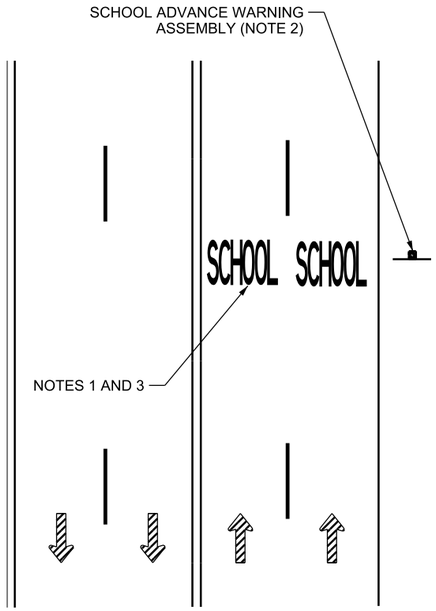
DEPUTY DIRECTOR

TYPICAL PAVEMENT MARKINGS

STANDARD DRAWING TITLE

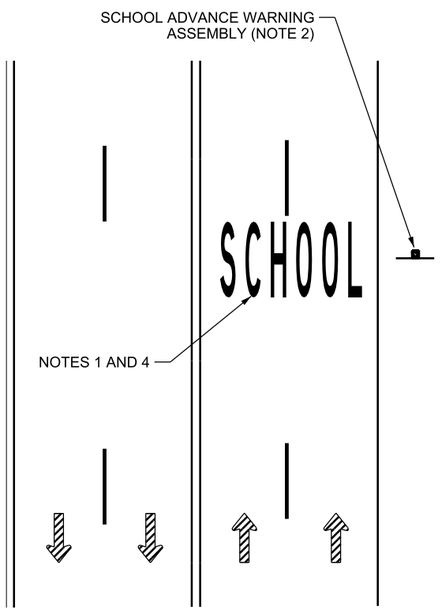
STD. DWG. NO.

ST 1



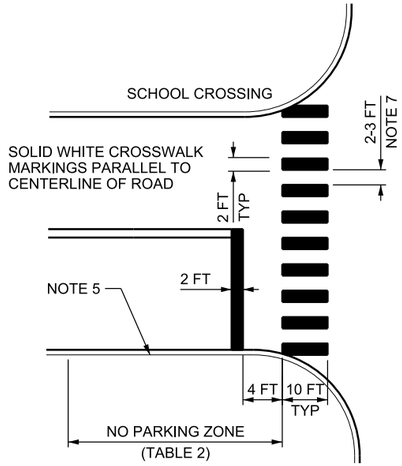
STANDARD

ONE MESSAGE PER LANE
ANY NUMBER OF LANES

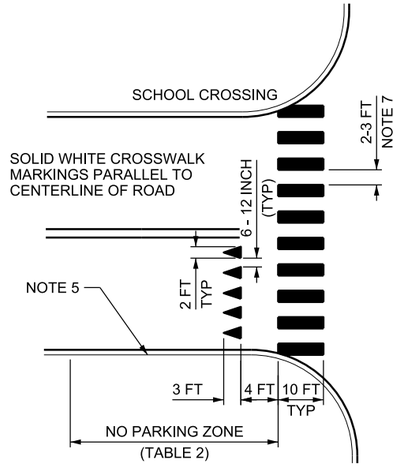


OPTION

ONE MESSAGE PER TWO LANES
EVEN NUMBER OF LANES ONLY



STOP OR SIGNAL CONTROL



YIELD CONTROL

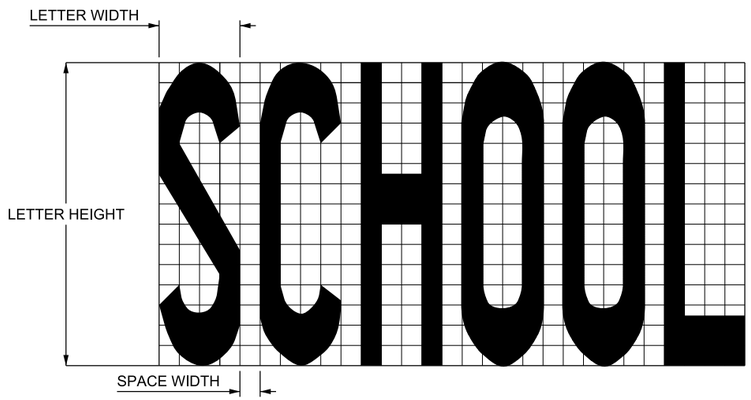


TABLE 1			
RECOMMENDED LETTER SIZES			
ONE-LANE MESSAGE			
LANE WIDTH (FT)	LETTER WIDTH (INCHES)	SPACE WIDTH (INCHES)	MINIMUM LETTER HEIGHT (FT)
12	18	5	6
11.5	17.5	4.5	6
11	16.5	4.25	6
10.5	15.75	4	6
10	15	3.75	6
TWO-LANE MESSAGE			
ALL	32	8	10

TABLE 2	
NO PARKING ZONE	
SPEED (MPH) (NOTE B)	LENGTH (FT)
25	60
30	85
35	115
40	150
45	190
50	230

NOTES:

1. PLACE ALL SCHOOL MESSAGES, PAVEMENT MARKINGS, AND SIGNING IN CONFORMANCE WITH THE UTAH TRAFFIC CONTROLS FOR SCHOOL ZONES (SECTION 7 OF THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES).
2. PLACE SCHOOL MESSAGE ADJACENT TO SCHOOL ADVANCE WARNING ASSEMBLY.
3. SINGLE LANE MESSAGES (STANDARD):
   - MAXIMUM MESSAGE WIDTH NOT TO EXCEED LANE WIDTH LESS 10 INCHES (FOR EXAMPLE, 12 FT TRAFFIC LANE WIDTH LESS 10 INCHES EQUALS 11 FT 2 INCHES MAXIMUM MESSAGE WIDTH).
   - MESSAGE TO BE COMPLETELY CONTAINED WITHIN TRAFFIC LANE, AND NOT ENCROACH UPON LANE STRIPING OR OTHER PAVEMENT MARKINGS.
4. TWO LANE MESSAGES (OPTIONAL):
   - USE TWO-LANE MESSAGE ONLY WHEN THERE ARE AN EVEN NUMBER OF LANES.
   - USE TWO-LANE MESSAGE UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.
   - ONE-HALF OF MESSAGE TO BE CONTAINED IN EACH TRAFFIC LANE. PAVEMENT MESSAGE TO BE WITHIN GAP OF 4 INCH BROKEN WHITE LINE BETWEEN LANES.
5. RED CURB MARKING IS OPTIONAL FOR "NO PARKING" ZONE.
6. NON-STATE ROUTES MAY USE 9 FT WIDE CROSSWALK MARKINGS.
7. VARY PLACEMENT OF CROSSWALK MARKINGS WITH A SPACING OF 2-3 FT TO AVOID WHEEL PATHS.
8. ESTABLISH A "NO PARKING" ZONE PRIOR TO SCHOOL CROSSING, SEE TABLE 2.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	MOVED ALL DESIGNER INFORMATION TO THE UDOT RDM. DELETED ST 4 TO ST 18

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

	DATE
RECOMMENDED FOR APPROVAL	AUG 29, 2019
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUG 29, 2019
DEPUTY DIRECTOR	DATE

SCHOOL CROSSING AND SCHOOL MESSAGE

STANDARD DRAWING TITLE

STD. DWG. NO.

ST 2

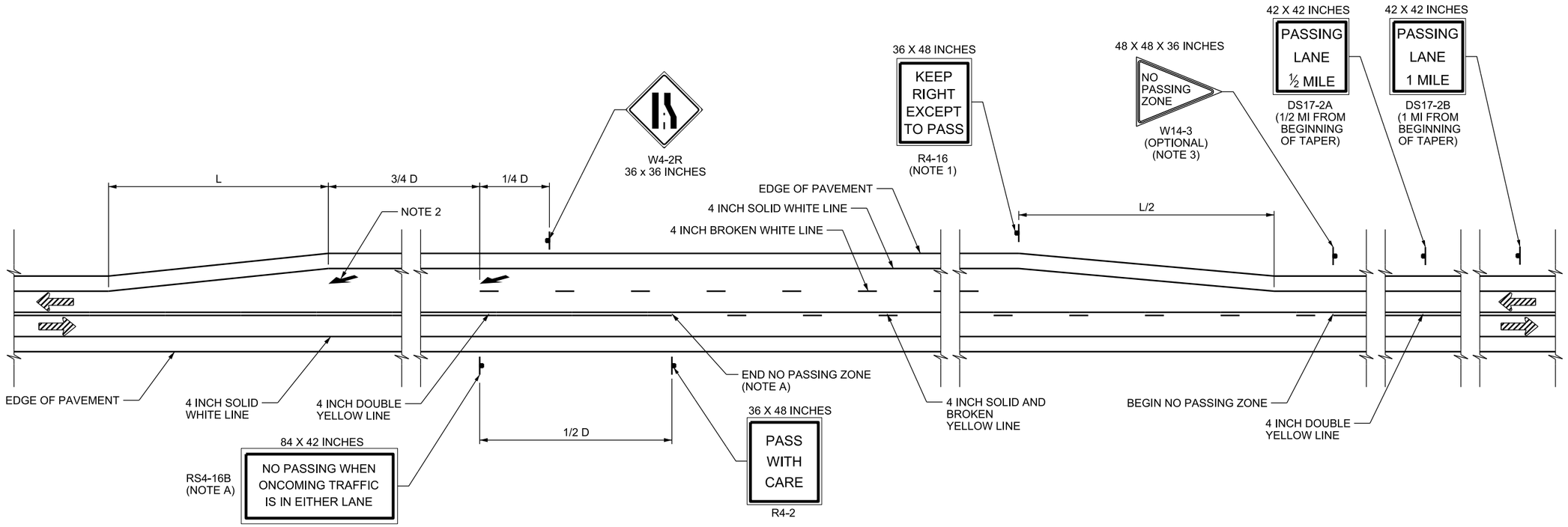


TABLE 1		
SPEED	FORMULA	RATE
LESS THAN 45 MPH	$L = \frac{WS^2}{60}$	$\frac{S^2}{60}:1$
45 MPH AND GREATER	L= WS	S:1

WHERE:
L = TAPER LENGTH IN FEET
W = WIDTH OF OFFSET IN FEET
S = DESIGN SPEED IN MPH

TABLE 2						
DESIGN SPEED (MPH)	LRT (SEC)	PRT (SEC)	CALC D (FT)	D (FT)	3/4 D (FT)	1/4 D (FT)
20	6.12	8.28	243.36	245	185	60
25	4.90	9.50	349.2	350	265	85
30	4.08	10.32	455.04	460	345	115
35	3.50	10.90	560.88	565	425	140
40	3.06	11.34	666.72	670	505	165
45	2.72	11.68	772.56	775	580	195
50	2.45	11.95	878.4	880	660	220
55	2.23	12.17	984.24	985	740	245
60	2.04	12.36	1090.08	1095	820	275
65	1.88	12.52	1195.92	1200	900	300
70	1.75	12.65	1301.76	1305	980	325
75	1.63	12.77	1407.6	1410	1060	350
80	1.53	12.87	1513.44	1515	1140	375
85	1.44	12.96	1619.28	1620	1215	405

WHERE:
LRT = LEGIBILITY REDUCTION TIME FOR 180 FT PER UTAH MUTCD
(LRT = 180 FT / 1.47 * DESIGN SPEED)
PRT = PERCEPTION REACTION TIME (PRT = MANEUVER TIME OF 14.4 SEC - LRT),
PER AASHTO DECISION SIGHT DISTANCE MANEUVER E
D = 1.47 * PRT * DESIGN SPEED

DESIGN NOTES:

A. PASSING IN OPPOSITE DIRECTION OF PASSING LANE IS PERMITTED, PROVIDED PASSING ZONE CRITERIA IS MET. SEE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR FURTHER GUIDANCE. USE THE RS4-16B SIGN (WITH APPROVAL OF THE REGION TRAFFIC ENGINEER) AND THE R4-2 SIGN, IF PASSING IN OPPOSITE DIRECTION IS DESIGNED. PLACE AS SHOWN AND REPEAT AT 1 MILE INTERVALS WHEN PASSING LANE EXCEEDS 1 1/2 MILES IN LENGTH.

B. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

C. CALCULATE CLEAR ZONE FROM SHOULDER LINE OF PASSING LANE USING MAINLINE DESIGN SPEED.

D. USE ONE CONTINUOUS PASSING LANE WHEN TWO OR MORE PASSING LANE SECTIONS ARE IN CLOSE PROXIMITY, AND THE GAP BETWEEN THE SECTIONS WOULD BE LESS THAN 1/2 MILE IN LENGTH.

E. USE A MINIMUM LENGTH OF 1,000 FT FOR PASSING LANES, NOT INCLUDING TAPERS.

F. PROVIDE A MINIMUM OF 1,000 FT PASSING LANE FOR EACH 1 MILE SECTION WHERE THERE IS NO PASSING SIGHT DISTANCE AND DESIGN HOURLY VOLUME EXCEEDS 80 TRUCKS.

G. EXTEND PASSING LANE PER CLIMBING LANE EXTENSION CRITERIA ON STD DWG ST 3A AND ST 3B IF PASSING LANE OCCURS AT THE CREST OF A HILL.

NOTES:

1. REPEAT THE R4-16 SIGN AT 1 MILE INTERVALS WHEN PASSING LANE EXCEEDS 2 MILES IN LENGTH.
2. LANE REDUCTION ARROWS REQUIRED FOR SPEEDS LESS THAN 45 MPH. SEE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) DIMENSIONS OF LANE REDUCTION ARROW.
3. PLACE THE W14-3 SIGN ON THE LEFT SHOULDER AT THE BEGINNING OF THE NO PASSING ZONE. SEE THE UTAH MUTCD FOR FURTHER GUIDANCE.
4. SEE STD DWG ST 1 FOR LINE DIMENSIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

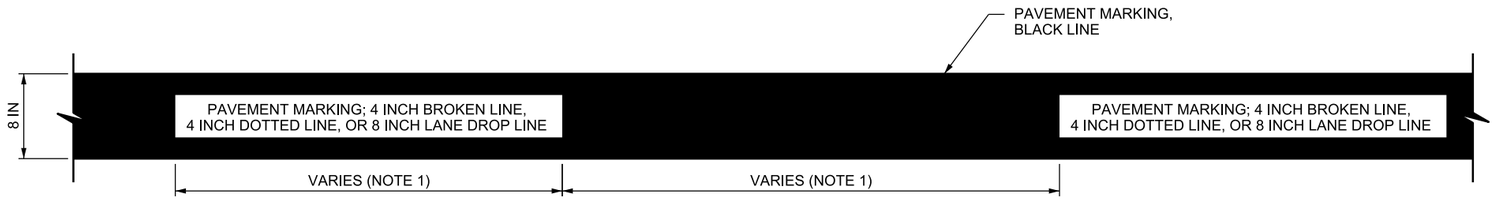
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN.01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN.01, 2017 DATE
DEPUTY DIRECTOR

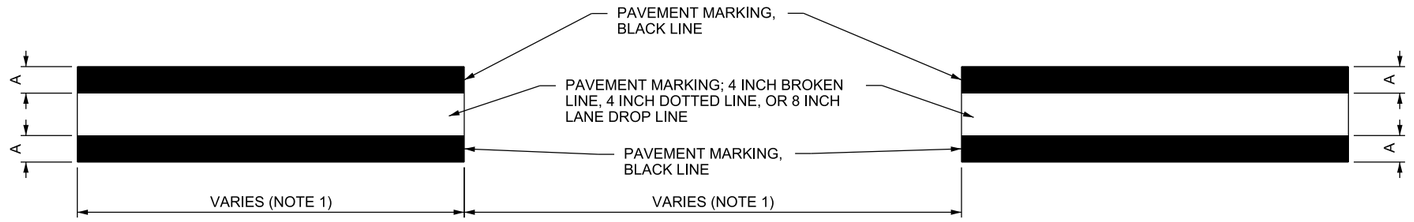
PASSING LANE DETAIL

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 2

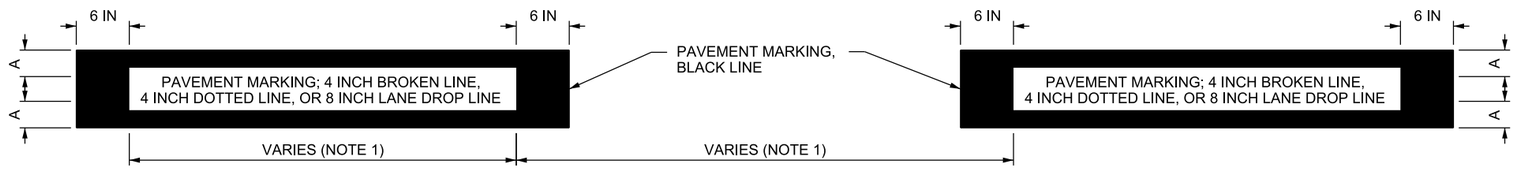


CONTINUOUS CONTRAST PAVEMENT MARKING



BACKGROUND CONTRAST PAVEMENT MARKING OPTION 1

DIMENSION "A"	
PAINT	TAPE
2-3 INCHES	1.5 INCH MIN



BACKGROUND CONTRAST PAVEMENT MARKING OPTION 2

NOTES:

1. SEE STD DWG ST 1 FOR LINE DIMENSIONS.
2. USE BACKGROUND CONTRAST PAVEMENT MARKING OPTION 1 WHEN BLACK AND WHITE LINES ARE APPLIED SIMULTANEOUSLY.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	REVISED NOTES, CHANGED SHEET NUMBER FROM ST 9 TO ST 3

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

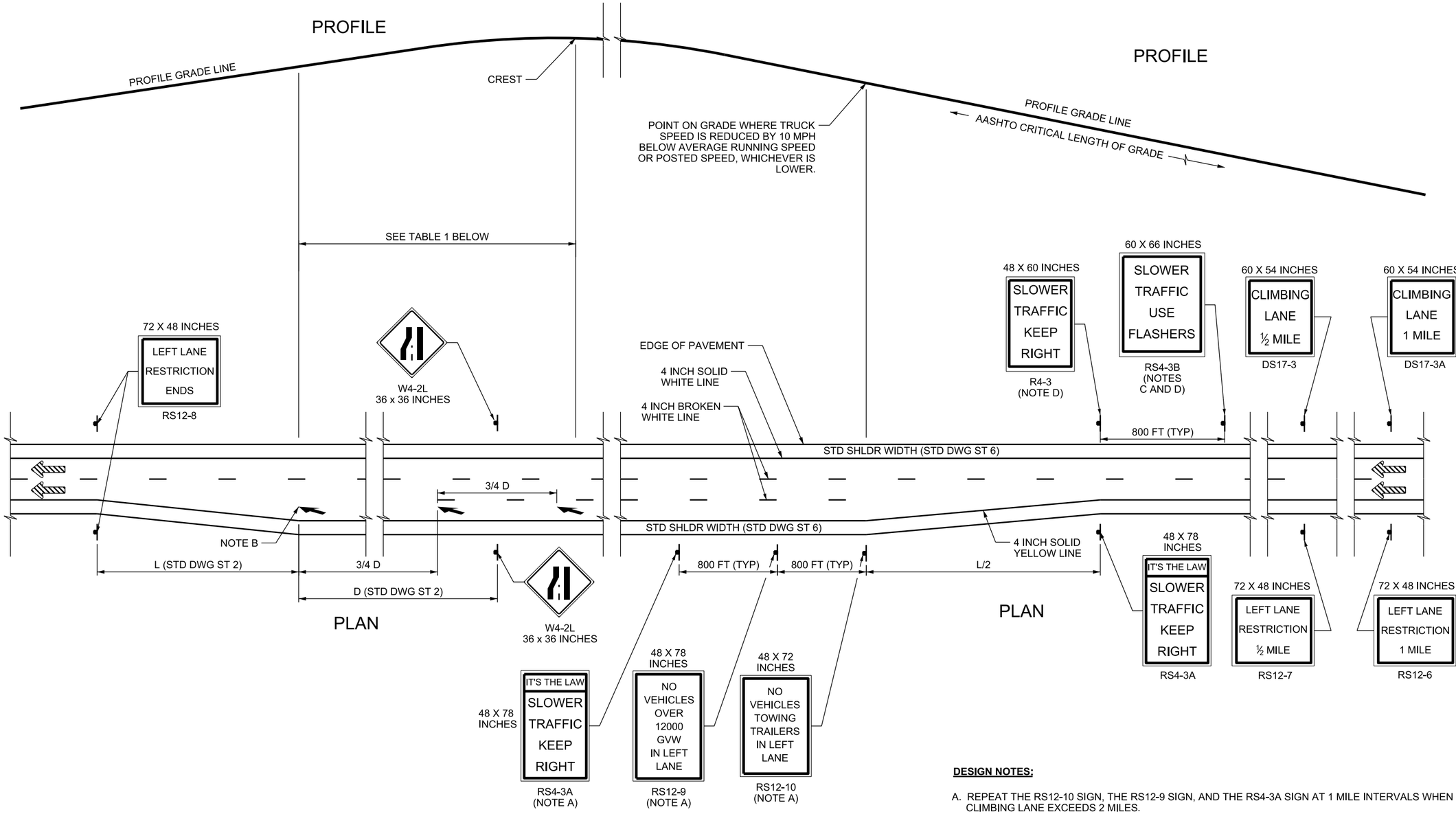
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

CONTRAST PAVEMENT MARKINGS FOR CONCRETE PAVEMENT

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 3



CLIMBING LANE CRITERIA

THE FOLLOWING SHOULD BE EVALUATED TO JUSTIFY THE ADDITION OF A CLIMBING LANE:

1. UPGRADE TRAFFIC FLOW RATE IN EXCESS OF 200 VEHICLES PER HOUR
2. UPGRADE TRUCK FLOW RATE IN EXCESS OF 20 VEHICLES PER HOUR
3. ONE OF THE FOLLOWING CONDITIONS EXISTS:
   A. A 10 MPH OR GREATER SPEED REDUCTION IS EXPECTED FOR A TYPICAL HEAVY TRUCK
   B. LEVEL OF SERVICE E OR F EXISTS ON THE GRADE
   C. A REDUCTION OF TWO OR MORE LEVELS OF SERVICE IS EXPERIENCED WHEN MOVING FROM THE APPROACH SEGMENT TO THE GRADE

TABLE 1 - PASSING / CLIMBING LANE EXTENSION DISTANCE

EXTEND PASSING / CLIMBING LANE THE GREATER OF:

- 300 FT OVER CREST, PROVIDED MINIMUM PASSING SIGHT DISTANCE IS AVAILABLE
- THE POINT WHERE TRUCK SPEED IS WITHIN 10 MPH OF AVERAGE RUNNING SPEED OR POSTED SPEED
- THE POINT WHERE MINIMUM PASSING SIGHT DISTANCE BECOMES AVAILABLE (PASSING LANES)

DESIGN NOTES:

A. REPEAT THE RS12-10 SIGN, THE RS12-9 SIGN, AND THE RS4-3A SIGN AT 1 MILE INTERVALS WHEN CLIMBING LANE EXCEEDS 2 MILES.

B. LANE REDUCTION ARROWS REQUIRED FOR SPEEDS 45 MPH OR GREATER. SEE THE STANDARD HIGHWAY SIGN AND MARKING BOOK FOR DIMENSIONS OF LANE REDUCTION ARROW.

C. USE THE RS4-3B SIGN UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.

D. REPEAT THE R4-3 SIGN, AND THE RS4-3B SIGN, IF USED, AT 1 MILE INTERVALS WHEN CLIMBING LANE EXCEEDS 2 MILES.

E. USE OF INSIDE WIDENING PREFERRED. SEE STD DWG ST 3B FOR OUTSIDE WIDENING DETAILS.

F. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

G. CALCULATE CLEAR ZONE FROM SHOULDER LINE OF CLIMBING LANE.

H. USE CONTINUOUS CLIMBING LANES WHEN TWO OR MORE CLIMBING LANE SECTIONS ARE JUSTIFIED IN CLOSE PROXIMITY, AND THE GAP BETWEEN THE SECTIONS WOULD BE LESS THAN 1/2 MILE IN LENGTH.

I. USE A MINIMUM LENGTH OF 1,000 FT FOR CLIMBING LANES, NOT INCLUDING TAPERS.

J. SEE STD DWG ST 1 FOR LINE DIMENSIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

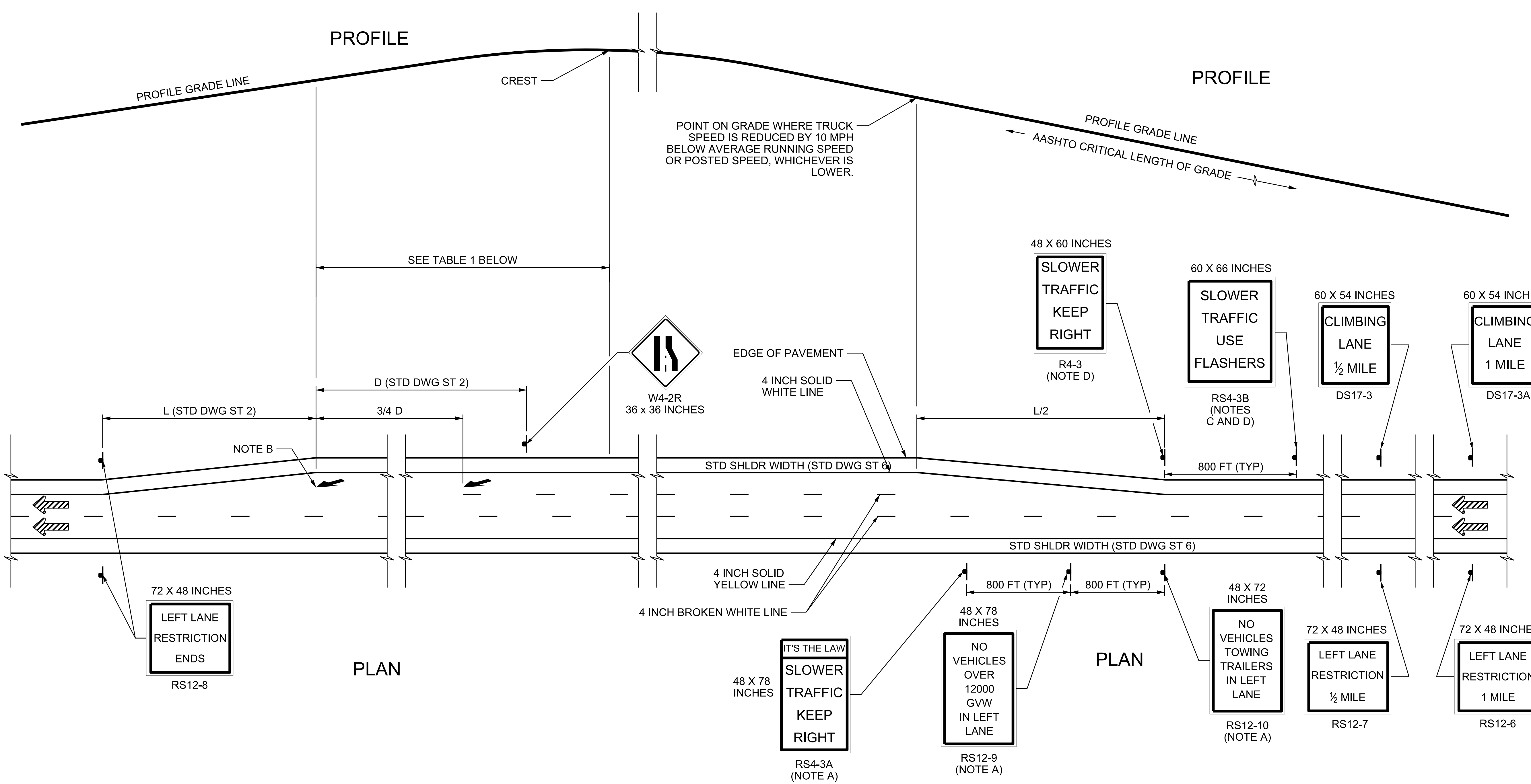
RECOMMENDED FOR APPROVAL — JAN.01.2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN.01.2017 DATE
DEPUTY DIRECTOR

FREEWAY CLIMBING LANE INSIDE WIDENING DETAIL

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 3A

08-AUG-2019
DGN File: D:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\Design - Tiffany Pocock\3-AgendaVersion\ST03A_DELETION.dgn



DESIGN NOTES:

A. REPEAT THE RS12-10 SIGN, THE RS12-9 SIGN, AND THE RS4-3A SIGN AT 1 MILE INTERVALS WHEN CLIMBING LANE EXCEEDS 2 MILES.

B. LANE REDUCTION ARROWS REQUIRED FOR SPEEDS 45 MPH OR GREATER. SEE THE STANDARD HIGHWAY SIGN AND MARKING BOOK FOR DIMENSIONS OF LANE REDUCTION ARROW.

C. USE THE RS4-3B SIGN UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.

D. REPEAT THE R4-3 SIGN, AND THE RS4-3B SIGN, IF USED, AT 1 MILE INTERVALS WHEN CLIMBING LANE EXCEEDS 2 MILES.

E. USE OF INSIDE WIDENING PREFERRED SEE STD DWG ST 3A. USE DETAILS THIS SHEET WHEN CONDITIONS REQUIRE OUTSIDE WIDENING.

F. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

G. CALCULATE CLEAR ZONE FROM SHOULDER LINE OF CLIMBING LANE.

H. USE CONTINUOUS CLIMBING LANES WHEN TWO OR MORE CLIMBING LANE SECTIONS ARE JUSTIFIED IN CLOSE PROXIMITY, AND THE GAP BETWEEN THE SECTIONS WOULD BE LESS THAN 1/2 MILE IN LENGTH.

I. USE A MINIMUM LENGTH OF 1,000 FT FOR CLIMBING LANES, NOT INCLUDING TAPERS.

J. SEE STD DWG ST 1 FOR LINE DIMENSIONS.

CLIMBING LANE CRITERIA

THE FOLLOWING SHOULD BE EVALUATED TO JUSTIFY THE ADDITION OF A CLIMBING LANE:

1. UPGRADE TRAFFIC FLOW RATE IN EXCESS OF 200 VEHICLES PER HOUR
2. UPGRADE TRUCK FLOW RATE IN EXCESS OF 20 VEHICLES PER HOUR
3. ONE OF THE FOLLOWING CONDITIONS EXISTS:
   A. A 10 MPH OR GREATER SPEED REDUCTION IS EXPECTED FOR A TYPICAL HEAVY TRUCK
   B. LEVEL OF SERVICE E OR F EXISTS ON THE GRADE
   C. A REDUCTION OF TWO OR MORE LEVELS OF SERVICE IS EXPERIENCED WHEN MOVING FROM THE APPROACH SEGMENT TO THE GRADE

TABLE 1 - PASSING / CLIMBING LANE EXTENSION DISTANCE

EXTEND PASSING / CLIMBING LANE THE GREATER OF:

- 300 FT OVER CREST, PROVIDED MINIMUM PASSING SIGHT DISTANCE IS AVAILABLE
- THE POINT WHERE TRUCK SPEED IS WITHIN 10 MPH OF AVERAGE RUNNING SPEED OR POSTED SPEED
- THE POINT WHERE MINIMUM PASSING SIGHT DISTANCE BECOMES AVAILABLE (PASSING LANES)

REVISIONS

NO.	DATE	APPR.	REMARKS

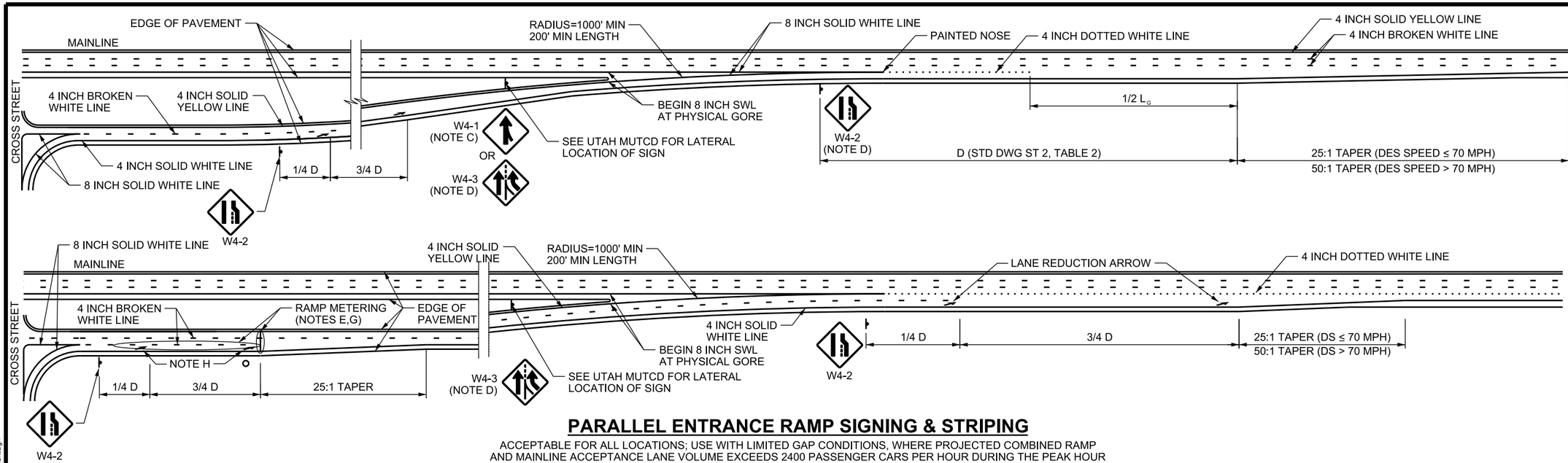
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN.01.2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN.01.2017 DATE
DEPUTY DIRECTOR

FREEWAY CLIMBING LANE OUTSIDE WIDENING DETAIL

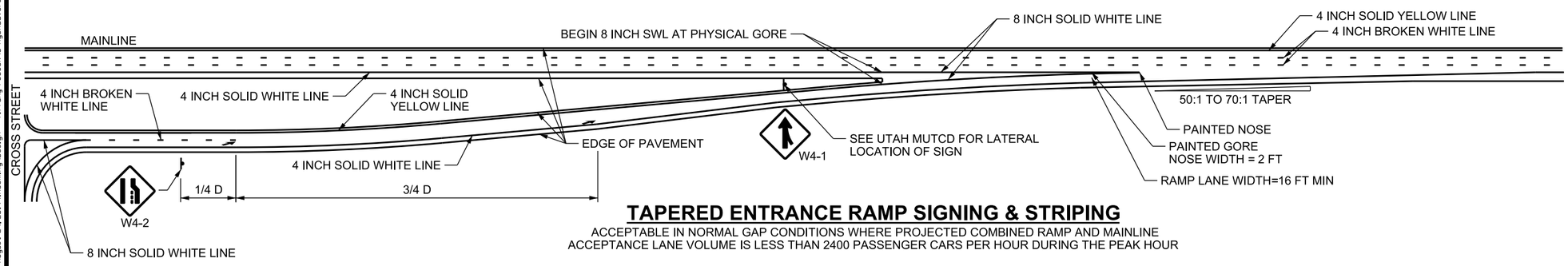
STANDARD DRAWING TITLE

STD. DWG. NO.
ST 3B



PARALLEL ENTRANCE RAMP SIGNING & STRIPING

ACCEPTABLE FOR ALL LOCATIONS; USE WITH LIMITED GAP CONDITIONS, WHERE PROJECTED COMBINED RAMP AND MAINLINE ACCEPTANCE LANE VOLUME EXCEEDS 2400 PASSENGER CARS PER HOUR DURING THE PEAK HOUR



TAPERED ENTRANCE RAMP SIGNING & STRIPING

ACCEPTABLE IN NORMAL GAP CONDITIONS WHERE PROJECTED COMBINED RAMP AND MAINLINE
ACCEPTANCE LANE VOLUME IS LESS THAN 2400 PASSENGER CARS PER HOUR DURING THE PEAK HOUR

DESIGN NOTES:

A. REFER TO UDOT ROADWAY DESIGN MANUAL DM DRAWING 10.1 AND THE UTAH MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR DESIGN OF ELEMENTS NOT SHOWN.

B. USE WB-67 FOR TURNING RADIUS FOR ALL TURNING MOVEMENTS.

C. USE MERGE SIGN (W4-1) WHEN THE FOLLOWING CONDITIONS ARE MET:
1. SINGLE LANE PARALLEL ENTRANCE RAMP OR
2. WHEN THE CALCULATED ACCELERATION PER AASHTO OR GAP ACCEPTANCE ARE NOT PROVIDED (SEE NOTES A AND E)
- DO NOT USE EITHER THE LANE ENDS SIGN (W4-2R) OR THE ADDED LANE SIGN (W4-3) WHEN USING THE W4-1 SIGN

D. USE ADDED LANE SIGN (W4-3) WHEN THE CALCULATED ACCELERATION PER AASHTO AND GAP ACCEPTANCE IS PROVIDED (SEE NOTES A AND E)
- DO NOT PLACE LANE ENDS (W4-2) SIGN WITHIN 200 FT OF THE PHYSICAL GORE
- PLACE LANE ENDS SIGN (W4-2) ONLY WHEN USING THE W4-3 SIGN

E. RAMP METER:
- PLACE THE RAMP METER STOP LINE AT THE CALCULATED STORAGE PER AT SERIES STD DWGS WHERE RAMP METER IS USED
- VERIFY RAMP METER STORAGE LENGTHS WITH CENTRAL TRAFFIC OPERATIONS DIVISION

F. SEE STD DWG ST 1 FOR LINE DIMENSIONS.

G. PLACE ITEMS ONLY WHEN RAMP WILL BE METERED. PLACE STOP LINE AT CALCULATED RAMP METER QUEUE FROM AT GRADE RAMP TERMINAL.

H. LANE-REDUCTION ARROWS ARE OPTIONAL FOR SPEEDS LESS THAN 45 MPH.

I. STANDARDS SHOWN ARE MINIMUM VALUES. EXCEED STANDARDS WHERE CONDITIONS PERMIT.

SUPPLEMENTAL DRAWING

REVISIONS

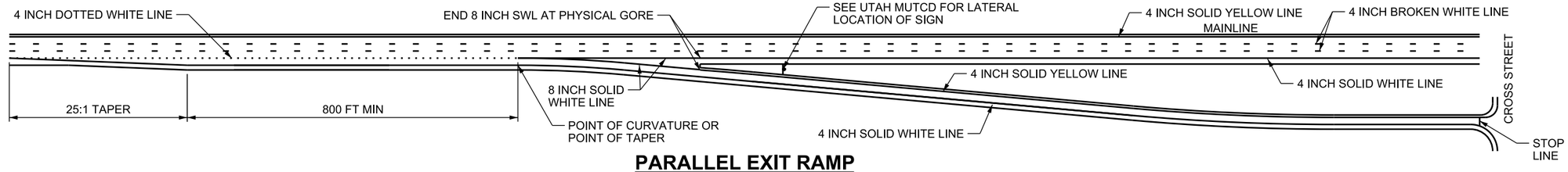
NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

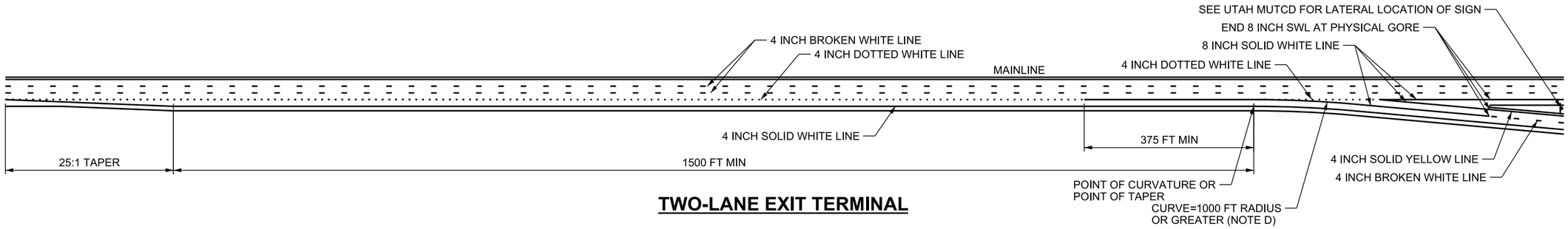
RECOMMENDED FOR APPROVAL — AUG 30, 2018 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 30, 2018 — DATE
DEPUTY DIRECTOR

ENTRANCE RAMP
PAVEMENT MARKINGS
STANDARD DRAWING TITLE

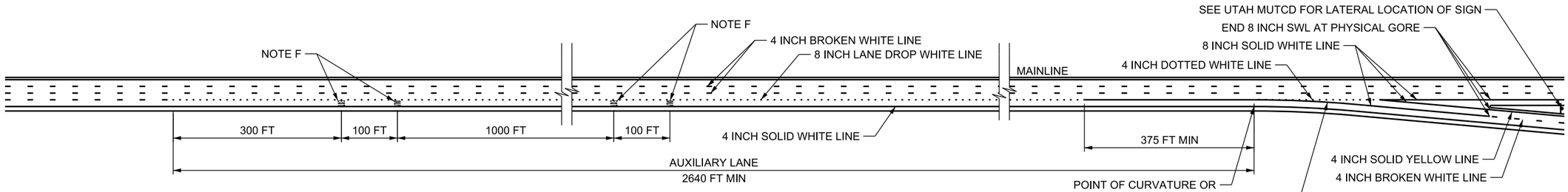
STD. DWG. NO.
ST 4



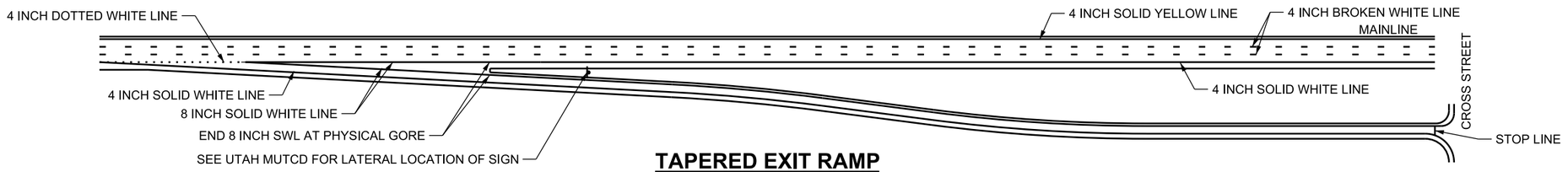
PARALLEL EXIT RAMP



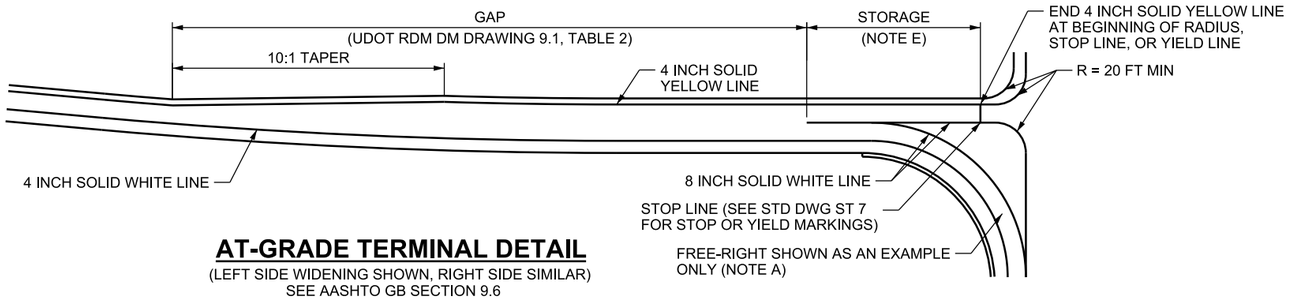
TWO-LANE EXIT TERMINAL



AUXILIARY LANE DROPPED - TWO-LANE EXIT TERMINAL



TAPERED EXIT RAMP



AT-GRADE TERMINAL DETAIL

(LEFT SIDE WIDENING SHOWN, RIGHT SIDE SIMILAR)
SEE AASHTO GB SECTION 9.6

DESIGN NOTES:

A. REFER TO THE UDOT ROADWAY DESIGN MANUAL DM DRAWING 10.2 AND THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

B. USE WB-67 FOR TURNING RADIUS FOR ALL TURNING MOVEMENTS.

C. SEE THE UDOT ROADWAY DESIGN MANUAL FOR CROSS SECTION ELEMENT REQUIREMENTS INCLUDING LANE AND SHOULDER WIDTHS.

D. IF THE DIVERGENCE ANGLE IS BETWEEN 2°-5° AND A CURVE WITH A 1000 FT RADIUS OR GREATER IS USED, SUPERELEVATION OF THIS CURVE IS NOT REQUIRED.

E. COORDINATE REQUIRED STORAGE LENGTH WITH REGION TRAFFIC ENGINEER.

F. USE 20 INCH X 10 FT LETTERS FOR "EXIT" AND "ONLY" PAVEMENT MESSAGES.

G. SEE STD DWG ST 1 FOR LINE DIMENSIONS.

H. STANDARDS SHOWN ARE MINIMUM VALUES. EXCEED STANDARDS WHERE CONDITIONS PERMIT.

SUPPLEMENTAL DRAWING

REVISIONS				
NO.	DATE	APPR.	REMARKS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

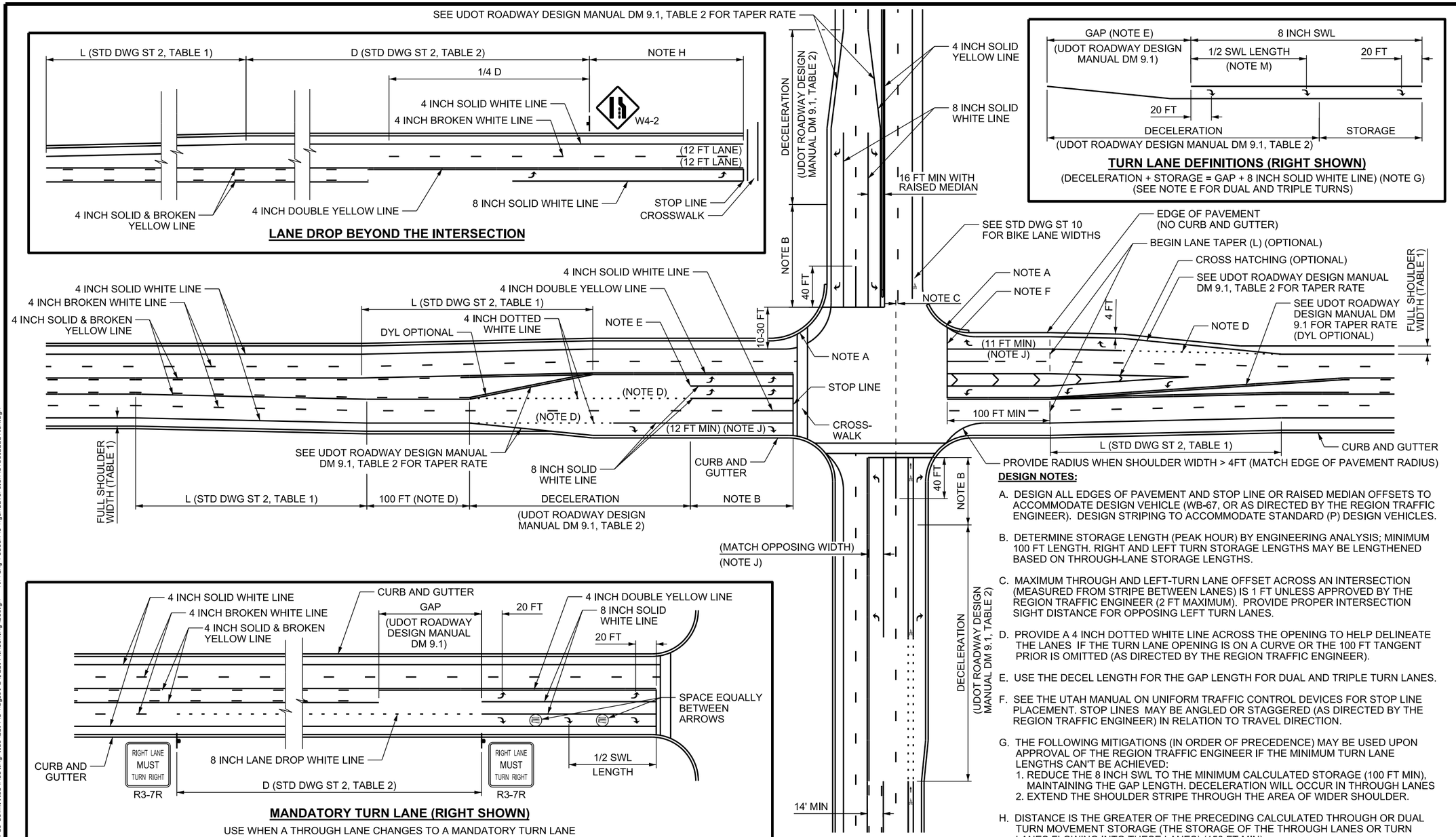
RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUG 30, 2018 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 30, 2018 DATE

EXIT RAMP
PAVEMENT MARKINGS
STANDARD DRAWING TITLE

STD. DWG. NO.
ST 5

LANE DROP BEYOND THE INTERSECTION



TURN LANE DEFINITIONS (RIGHT SHOWN)

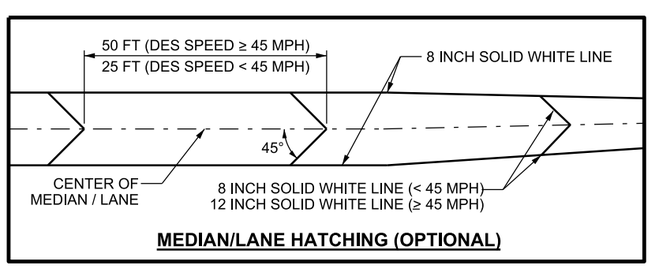
(DECELERATION + STORAGE = GAP + 8 INCH SOLID WHITE LINE) (NOTE G)
(SEE NOTE E FOR DUAL AND TRIPLE TURNS)

MANDATORY TURN LANE (RIGHT SHOWN)

USE WHEN A THROUGH LANE CHANGES TO A MANDATORY TURN LANE

TABLE 1 - SHOULDER WIDTH*			
DESIGN SPEED (MPH) OR	**UNDER 40**	**40 - 55**	**OVER 55**
VOLUME (AADT)**	**UNDER 2000**	**2000 TO 6000**	**OVER 6000****
FRONTAGE OR ACCESS ROAD	2 FT	4 FT	8 FT
COLLECTOR ROAD	4 FT	8 FT	10 FT
MINOR ARTERIAL	4 FT	8 FT	10 FT
PRINCIPAL ARTERIAL	4 FT	8 FT	12 FT

*USE THE SMALLER SHOULDER WIDTH OF THE DESIGN SPEED OR THE VOLUME. USE A 12 FT SHOULDER TO WHERE ON-STREET PARKING IS PERMITTED OR FREQUENT ACCESSES.
**SHOULDER WIDTH MAY BE REDUCED BY 2 FT (OVER 6000 AADT COLUMN ONLY), IF TRUCK VOLUME IS < 15% OF AADT.



MEDIAN/LANE HATCHING (OPTIONAL)

DESIGN NOTES:

A. DESIGN ALL EDGES OF PAVEMENT AND STOP LINE OR RAISED MEDIAN OFFSETS TO ACCOMMODATE DESIGN VEHICLE (WB-67, OR AS DIRECTED BY THE REGION TRAFFIC ENGINEER). DESIGN STRIPING TO ACCOMMODATE STANDARD (P) DESIGN VEHICLES.

B. DETERMINE STORAGE LENGTH (PEAK HOUR) BY ENGINEERING ANALYSIS; MINIMUM 100 FT LENGTH. RIGHT AND LEFT TURN STORAGE LENGTHS MAY BE LENGTHENED BASED ON THROUGH-LANE STORAGE LENGTHS.

C. MAXIMUM THROUGH AND LEFT-TURN LANE OFFSET ACROSS AN INTERSECTION (MEASURED FROM STRIPE BETWEEN LANES) IS 1 FT UNLESS APPROVED BY THE REGION TRAFFIC ENGINEER (2 FT MAXIMUM). PROVIDE PROPER INTERSECTION SIGHT DISTANCE FOR OPPOSING LEFT TURN LANES.

D. PROVIDE A 4 INCH DOTTED WHITE LINE ACROSS THE OPENING TO HELP DELINEATE THE LANES IF THE TURN LANE OPENING IS ON A CURVE OR THE 100 FT TANGENT PRIOR IS OMITTED (AS DIRECTED BY THE REGION TRAFFIC ENGINEER).

E. USE THE DECEL LENGTH FOR THE GAP LENGTH FOR DUAL AND TRIPLE TURN LANES.

F. SEE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STOP LINE PLACEMENT. STOP LINES MAY BE ANGLED OR STAGGERED (AS DIRECTED BY THE REGION TRAFFIC ENGINEER) IN RELATION TO TRAVEL DIRECTION.

G. THE FOLLOWING MITIGATIONS (IN ORDER OF PRECEDENCE) MAY BE USED UPON APPROVAL OF THE REGION TRAFFIC ENGINEER IF THE MINIMUM TURN LANE LENGTHS CAN'T BE ACHIEVED:
1. REDUCE THE 8 INCH SWL TO THE MINIMUM CALCULATED STORAGE (100 FT MIN), MAINTAINING THE GAP LENGTH. DECELERATION WILL OCCUR IN THROUGH LANES
2. EXTEND THE SHOULDER STRIPE THROUGH THE AREA OF WIDER SHOULDER.

H. DISTANCE IS THE GREATER OF THE PRECEDING CALCULATED THROUGH OR DUAL TURN MOVEMENT STORAGE (THE STORAGE OF THE THROUGH LANES OR TURN LANES FLOWING INTO THESE LANES) (150 FT MIN).

I. PROVIDE A TWO-WAY LEFT TURN LANE CONNECTING ADJACENT ACCESSES WHEN OPPOSING TAPERS OVERLAP OR AS DIRECTED BY THE REGION TRAFFIC ENGINEER.

J. LANE WIDTHS MAY BE REDUCED UPON APPROVAL OF THE REGION TRAFFIC ENGINEER:
- THROUGH (11 FT MIN), RT TURN (10 FT MIN), LT TURN (11 FT MIN), AND MEDIAN (12 FT MIN)

K. PROVIDE A MINIMUM 100 FT TANGENT APPROACH SECTION PRIOR TO STOP LINES. USE THE SAME ENTRANCE AND EXIT BEARINGS FOR OPPOSING INTERSECTION DIRECTIONS.

L. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

M. PLACE A THIRD ARROW AT ONE HALF THE DISTANCE OF THE 8 INCH SOLID WHITE LINE (SWL) IF THE 8 INCH SWL IS GREATER THAN 250 FT OR AT THE DIRECTION OF THE REGION TRAFFIC ENGINEER. PLACE ONLY THE TWO TURN ARROWS OTHERWISE. RIGHT TURN ARROWS ARE OPTIONAL IN NON-MANDATORY RIGHT TURN LANES.

N. STANDARDS SHOWN ARE MINIMUM VALUES. EXCEED STANDARDS WHERE FEASIBLE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

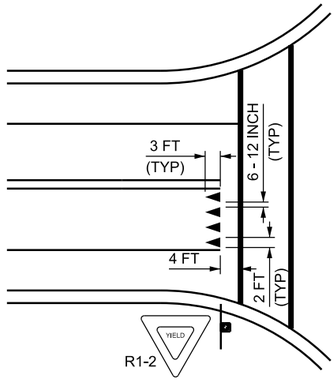
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG 30, 2018 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 30, 2018 — DATE
DEPUTY DIRECTOR — DATE

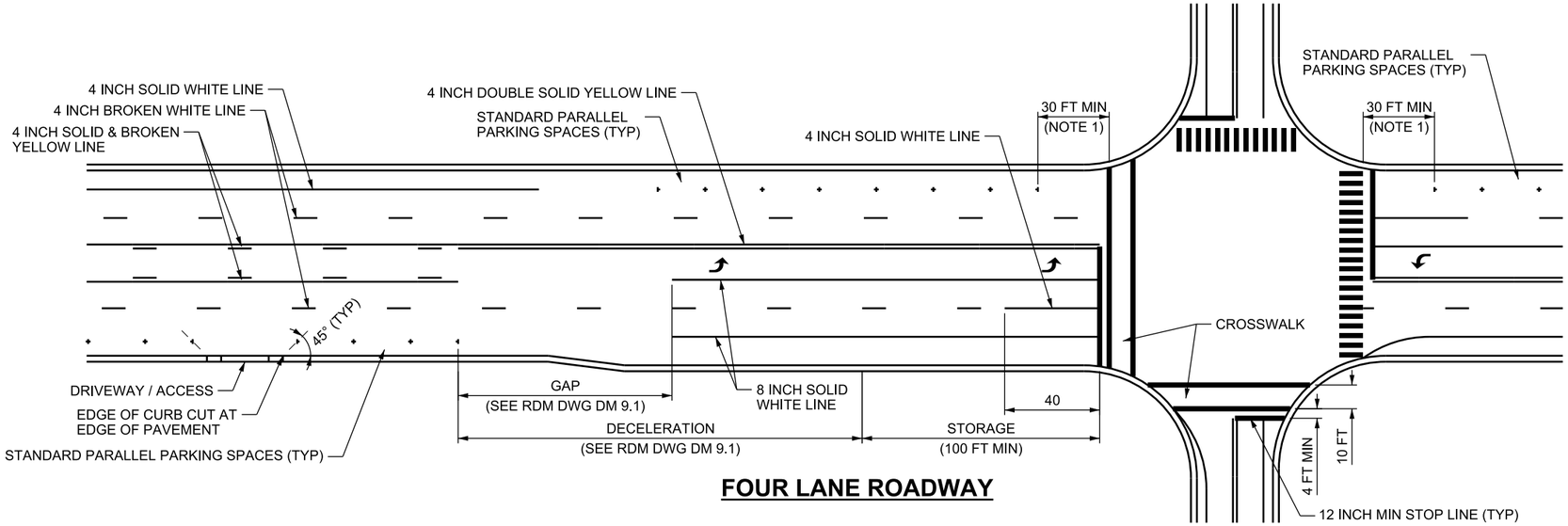
INTERSECTION PAVEMENT MARKINGS
STANDARD DRAWING TITLE

STD. DWG. NO.
ST 6

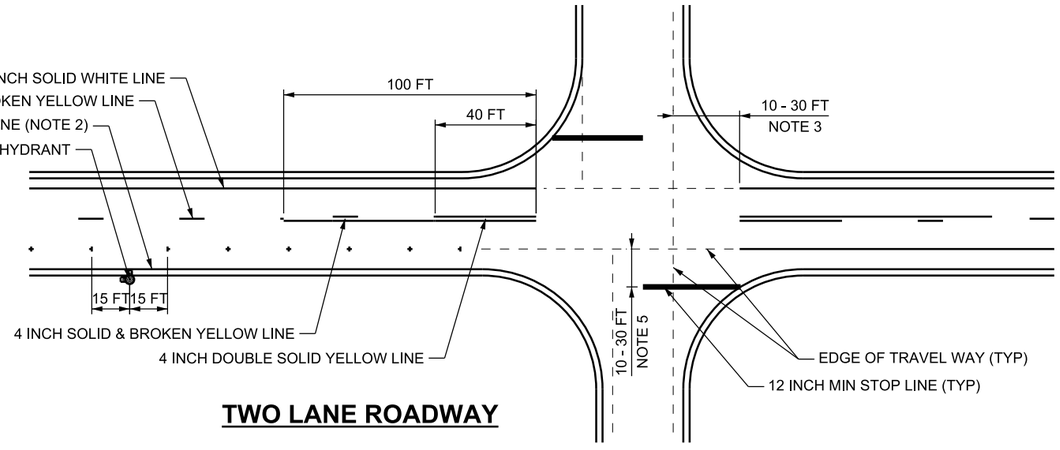
DGN File: G:\Standardsand Specs Section\Standards Committee\Meeting Files\2019\5-August 29, 2019\Incoming\Design - Tiffany Pocock\13-AgendaVersion\ST06_DELETION.dgn
08-AUG-2019



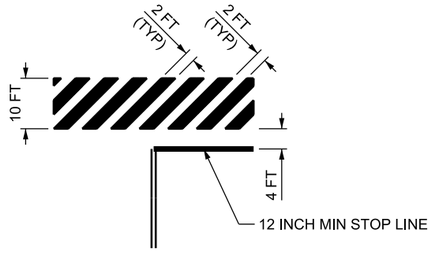
TYPICAL YIELD LINE



FOUR LANE ROADWAY

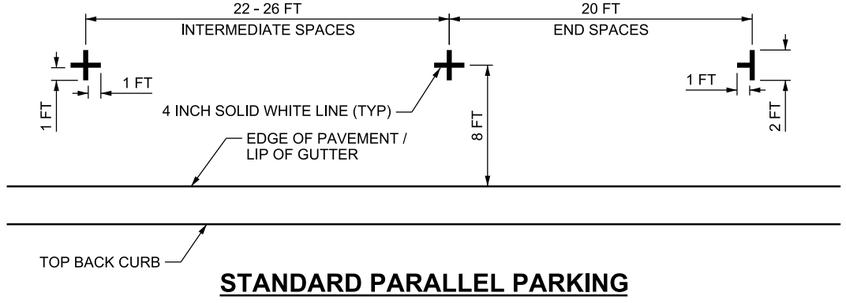


TWO LANE ROADWAY



SPECIAL EMPHASIS CROSSWALK

SOLID WHITE DIAGONAL LINES AT 45° TO DIRECTION OF TRAVEL



STANDARD PARALLEL PARKING

NOTES:

1. ESTABLISH A "NO PARKING" ZONE 30 FT PRIOR TO FLASHING SIGNAL, STOP SIGN, YIELD SIGN, OR SIGNAL.
2. RED CURB MARKING IS OPTIONAL FOR "NO PARKING" ZONE.
3. PLACE STOP LINE 10-30 FT AWAY FROM THE EDGE OF TRAVEL WAY OF THE CROSS TRAFFIC TO ACCOMMODATE TURNING VEHICLES AND PROVIDE PROPER INTERSECTION SIGHT DISTANCE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/28/19	CGW	REMOVED PARKING LOT STRIPING AND UPDATED NOTES

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — FEB. 28, 2019 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — FEB. 28, 2019 DATE

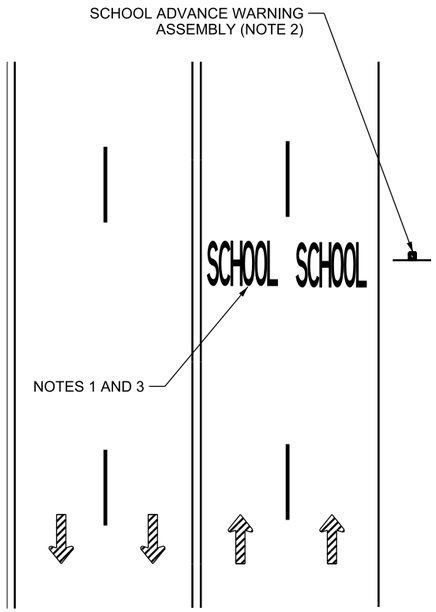
DEPUTY DIRECTOR

CROSSWALKS, PARKING, AND INTERSECTION APPROACHES

STANDARD DRAWING TITLE

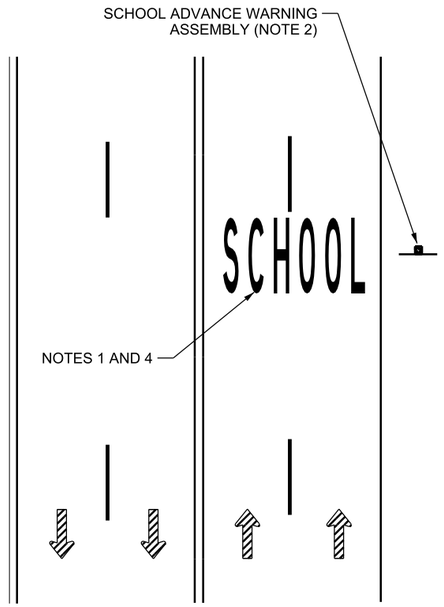
STD. DWG. NO.

ST 7



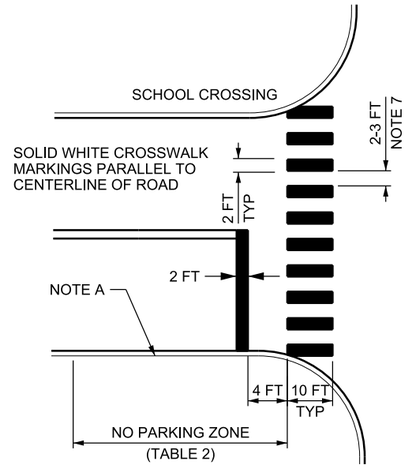
STANDARD

ONE MESSAGE PER LANE
ANY NUMBER OF LANES

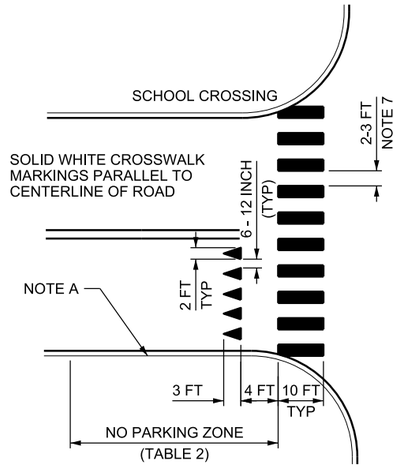


OPTION

ONE MESSAGE PER TWO LANES
EVEN NUMBER OF LANES ONLY



STOP OR SIGNAL CONTROL



YIELD CONTROL

TABLE 2	
NO PARKING ZONE	
SPEED (MPH) (NOTE B)	LENGTH (FT)
25	60
30	85
35	115
40	150
45	190
50	230

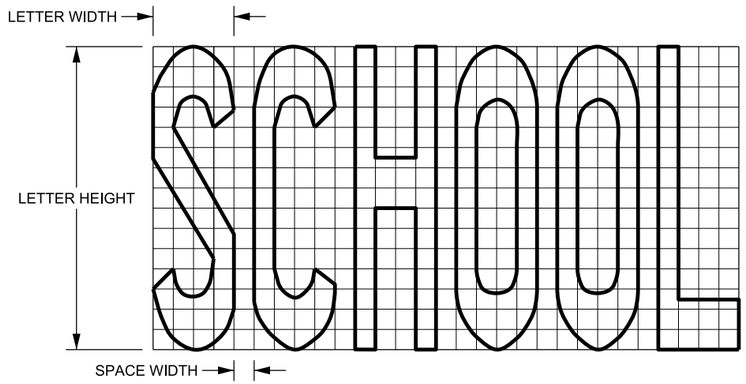


TABLE 1			
RECOMMENDED LETTER SIZES			
ONE-LANE MESSAGE			
LANE WIDTH (FT)	LETTER WIDTH (INCHES)	SPACE WIDTH (INCHES)	MINIMUM LETTER HEIGHT (FT)
12	18	5	6
11.5	17.5	4.5	6
11	16.5	4.25	6
10.5	15.75	4	6
10	15	3.75	6
TWO-LANE MESSAGE			
ALL	32	8	10

DESIGN NOTES:

A. ESTABLISH A "NO PARKING" ZONE PRIOR TO SCHOOL CROSSING, SEE TABLE 2.

B. USE THE GREATER OF (IN ORDER OF PRECEDENCE):
- THE 85TH PERCENTILE SPEED
- OPERATING SPEED DETERMINED BY DESIGN TEAM
- POSTED SPEED

NOTES:

1. PLACE ALL SCHOOL MESSAGES, PAVEMENT MARKINGS, AND SIGNING IN CONFORMANCE WITH THE UTAH TRAFFIC CONTROLS FOR SCHOOL ZONES (SECTION 7 OF THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES).
2. PLACE SCHOOL MESSAGE ADJACENT TO SCHOOL ADVANCE WARNING ASSEMBLY.
3. SINGLE LANE MESSAGES (STANDARD):
   - MAXIMUM MESSAGE WIDTH NOT TO EXCEED LANE WIDTH LESS 10 INCHES (FOR EXAMPLE, 12 FT TRAFFIC LANE WIDTH LESS 10 INCHES EQUALS 11 FT 2 INCHES MAXIMUM MESSAGE WIDTH).
   - MESSAGE TO BE COMPLETELY CONTAINED WITHIN TRAFFIC LANE, AND NOT ENCROACH UPON LANE STRIPING OR OTHER PAVEMENT MARKINGS.
4. TWO LANE MESSAGES (OPTIONAL):
   - USE TWO-LANE MESSAGE ONLY WHEN THERE ARE AN EVEN NUMBER OF LANES.
   - USE TWO-LANE MESSAGE UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.
   - ONE-HALF OF MESSAGE TO BE CONTAINED IN EACH TRAFFIC LANE. PAVEMENT MESSAGE TO BE WITHIN GAP OF 4 INCH BROKEN WHITE LINE BETWEEN LANES.
5. RED CURB MARKING IS OPTIONAL FOR "NO PARKING" ZONE.
6. NON-STATE ROUTES MAY USE 9 FT WIDE CROSSWALK MARKINGS.
7. PLACE CROSSWALK MARKINGS 2 FT TO 3 FT APART TO AVOID WHEEL PATHS.

NO.	DATE	APPR.	REVISIONS	REMARKS

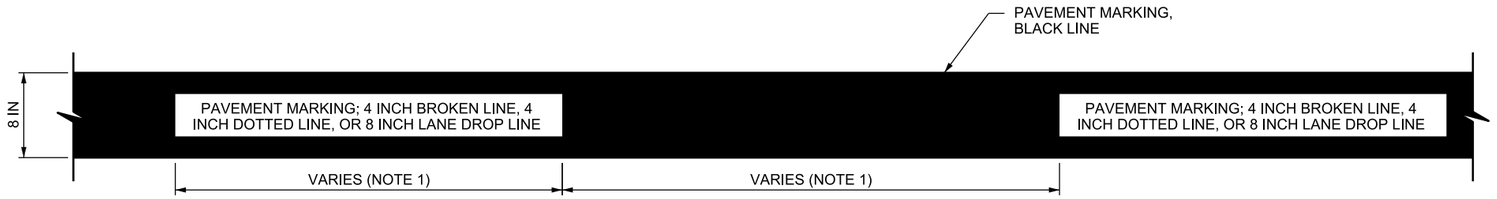
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN.01.2017 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — JAN.01.2017 DATE
DEPUTY DIRECTOR

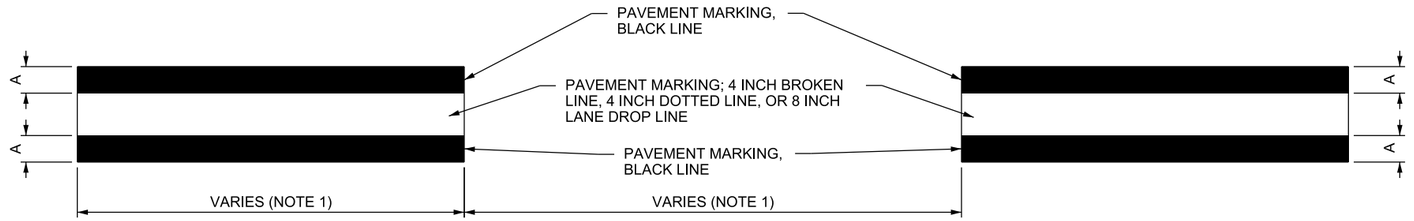
SCHOOL CROSSING AND SCHOOL MESSAGE

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 8

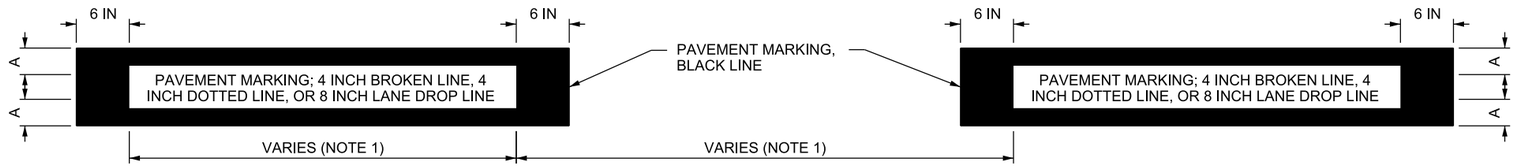


CONTINUOUS CONTRAST PAVEMENT MARKING



BACKGROUND CONTRAST PAVEMENT MARKING OPTION 1

DIMENSION "A"	
PAINT	TAPE
2-3 INCHES	1.5 INCH MIN



BACKGROUND CONTRAST PAVEMENT MARKING OPTION 2

NOTES:

1. SEE STD DWG ST 1 FOR LINE DIMENSIONS.
2. USE BACKGROUND CONTRAST OPTION 1 WHEN BLACK AND WHITE LINES ARE APPLIED SIMULTANEOUSLY.
3. USE OF CONTRAST PAVEMENT MARKINGS IS AT THE DISCRETION OF THE REGION TRAFFIC ENGINEER.
4. DETAILS SHOWN ARE FOR PORTLAND CEMENT CONCRETE PAVEMENT (PCCP).

REVISIONS

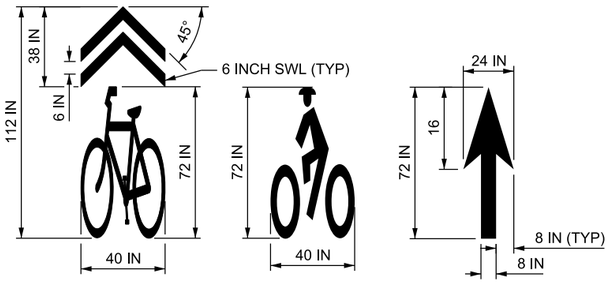
NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN.01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN.01, 2017 DATE
DEPUTY DIRECTOR

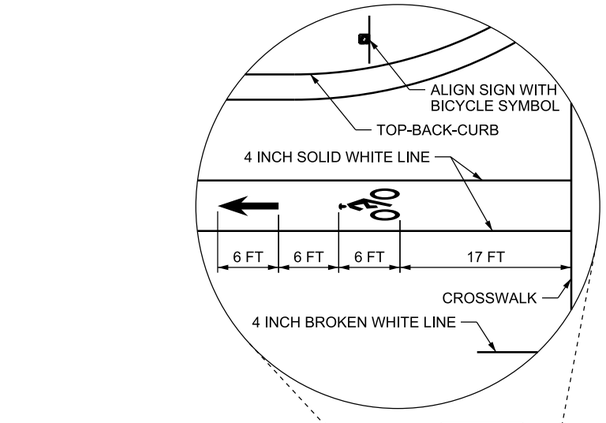
CONTRAST PAVEMENT MARKINGS FOR CONCRETE PAVEMENT
STANDARD DRAWING TITLE

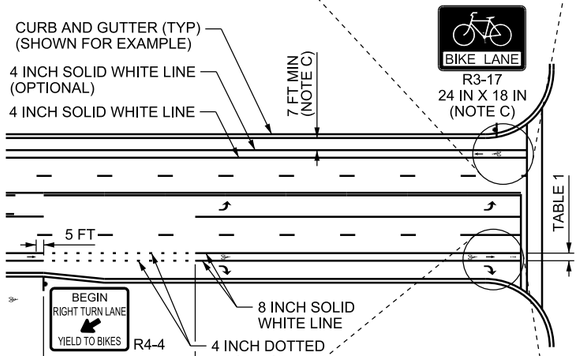
STD. DWG. NO.
ST 9

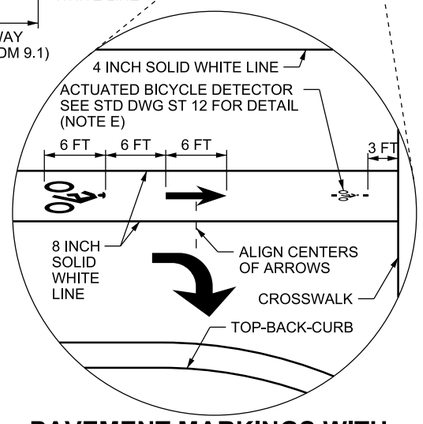


BICYCLE PAVEMENT MESSAGE DETAILS

NOTE D

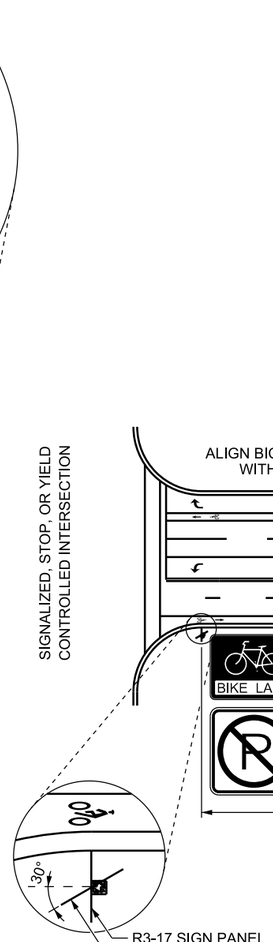


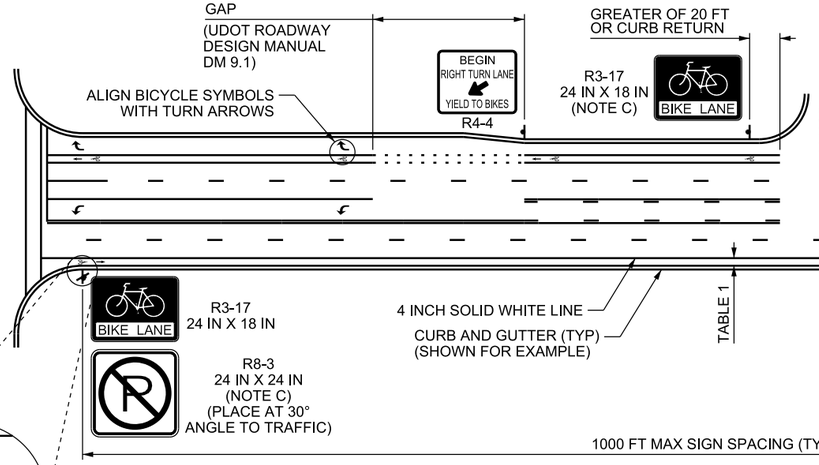




PAVEMENT MARKINGS WITH ACTUATED BICYCLE DETECTOR

SIGNALIZED, STOP, OR YIELD CONTROLLED INTERSECTION





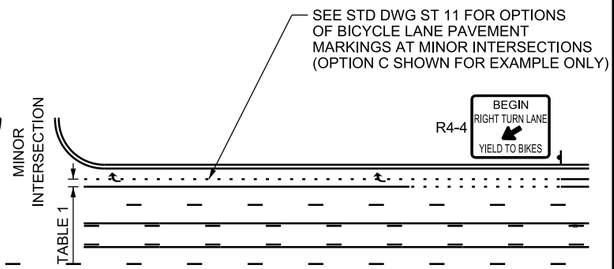


TABLE 1 - BICYCLE LANE WIDTH		
DESIGN SPEED OR	**< 45 MPH**	**≥ 50 MPH**
VOLUME	**< 6,000 ADT**	**≥ 6,000 ADT**
ON STREET PARKING	5-7 FT	5-7 FT
NO ON STREET PARKING	4-5 FT	
VERTICAL SURFACE*	5-7 FT	
NO VERTICAL SURFACE*	4-5 FT	

*VERTICAL SURFACE IS ANY CONTINUOUS OR REPEATED VERTICAL OR NEAR VERTICAL ELEMENT GREATER THAN 18 INCHES IN HEIGHT, INCLUDING BUT NOT LIMITED TO: BARRIER, GUARDRAIL, WALLS, AND PARKED VEHICLES.

DESIGN NOTES:

A. USE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AND THE AASHTO GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES FOR DESIGN OF ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

B. SEE STD DWG ST 1 FOR LINE DIMENSIONS.

C. USE NO PARKING SIGN, R8-3 WHEN SHOULDER WIDTH IS LESS THAN 7 FT.

D. REFER TO THE STANDARD HIGHWAY SIGNS MANUAL FOR ADDITIONAL PAVEMENT MESSAGE DIMENSIONING AND DETAILS.

E. INSTALL BICYCLE DETECTOR PAVEMENT MARKINGS ONLY ON ACTUATED APPROACHES WHERE DETECTION IS THE ONLY MECHANISM USED TO CALL THE SIGNAL PHASE (WHERE IT IS NECESSARY FOR THE CYCLISTS TO STOP AND WAIT IN CERTAIN LOCATIONS TO ACTIVATE THE TRAFFIC SIGNAL). CONTACT THE REGION SIGNAL ENGINEER FOR SPECIFICS ON WHICH DETECTORS ARE USED TO CALL THE PHASES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG 30, 2018 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 30, 2018 — DATE

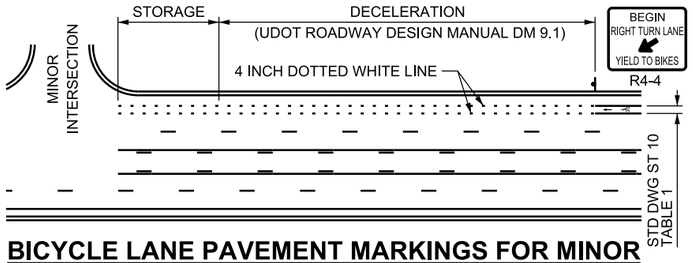
DEPUTY DIRECTOR

BICYCLE LANE
PAVEMENT MARKINGS
(SHEET 1 OF 2)

STANDARD DRAWING TITLE

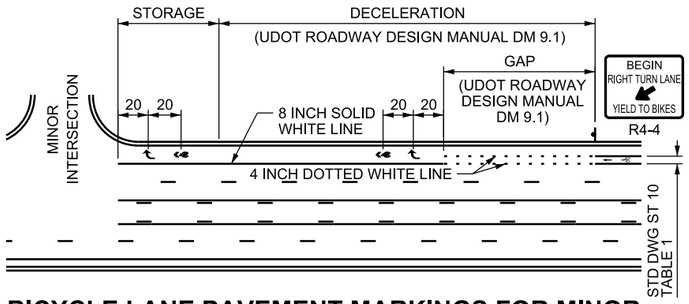
STD. DWG. NO.

ST 10



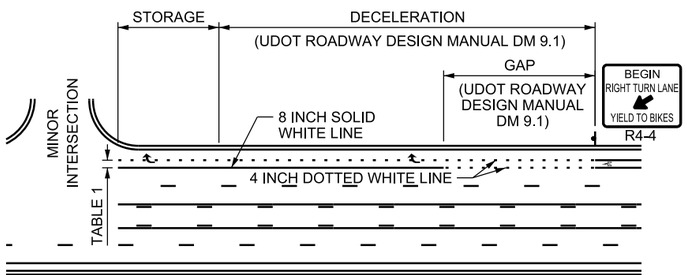
BICYCLE LANE PAVEMENT MARKINGS FOR MINOR INTERSECTIONS AND BUS STOPS - OPTION A

MINIMUM RIGHT TURN VOLUME OF 10 VPH



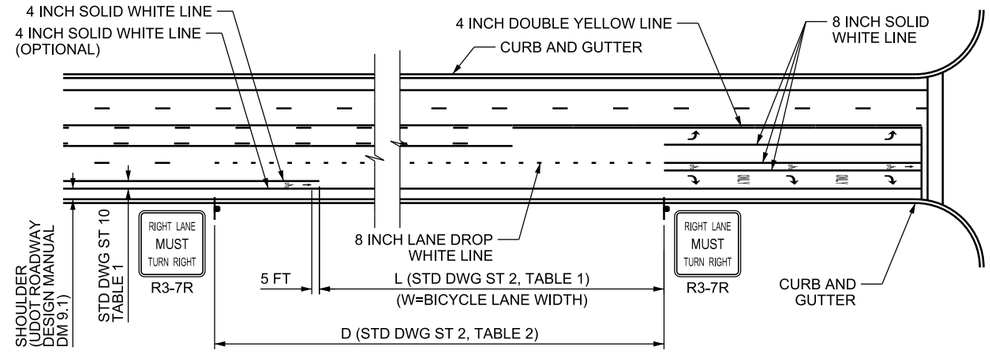
BICYCLE LANE PAVEMENT MARKINGS FOR MINOR INTERSECTIONS AND BUS STOPS - OPTION B

MINIMUM RIGHT TURN VOLUME OF 10 VPH

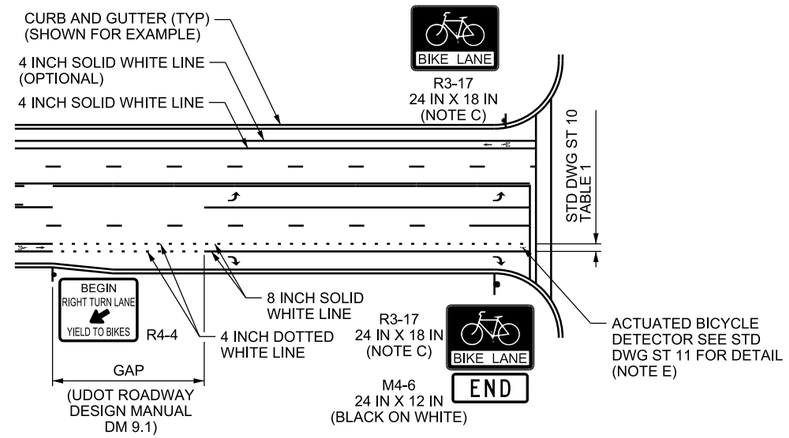


BICYCLE LANE PAVEMENT MARKINGS FOR MINOR INTERSECTIONS - OPTION C

MINIMUM RIGHT TURN VOLUME OF 10 VPH



BICYCLE LANE WITH A MANDATORY RIGHT TURN LANE



BICYCLE MARKINGS WHEN BICYCLE LANE ENDS AT INTERSECTION

DESIGN NOTES:

A. USE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AND THE AASHTO GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES FOR DESIGN OF ELEMENTS NOT SHOWN ON THIS STANDARD DRAWING.

B. SEE STD DWG ST 1 FOR LINE DIMENSIONS.

C. USE NO PARKING SIGN, R8-3 WHEN SHOULDER WIDTH IS LESS THAN 7 FT.

D. USE CORRIDOR-SIMILAR DESIGN WHEN SELECTING PAVEMENT MARKINGS FOR RIGHT\ TURNS AT MINOR INTERSECTIONS (OPTIONS A, B, OR C).

E. INSTALL BICYCLE DETECTOR PAVEMENT MARKINGS ONLY ON ACTUATED APPROACHES WHERE DETECTION IS THE ONLY MECHANISM USED TO CALL THE SIGNAL PHASE (WHERE IT IS NECESSARY FOR THE CYCLISTS TO STOP AND WAIT IN CERTAIN LOCATIONS TO ACTIVATE THE TRAFFIC SIGNAL). CONTACT THE REGION SIGNAL ENGINEER FOR SPECIFICS ON WHICH DETECTORS ARE USED TO CALL THE PHASES.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG 30, 2018 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 30, 2018 — DATE
DEPUTY DIRECTOR

BICYCLE LANE
PAVEMENT MARKINGS
(SHEET 2 OF 2)

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 11

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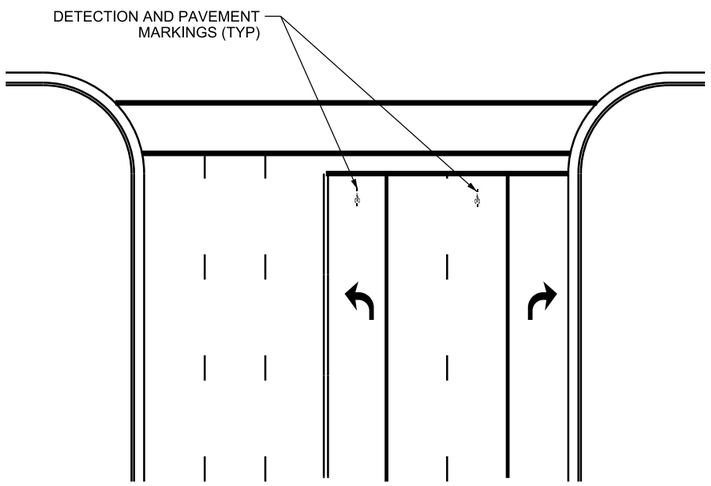
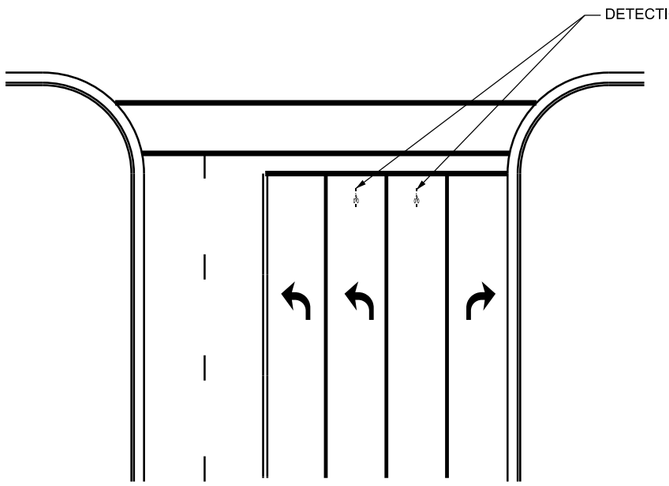
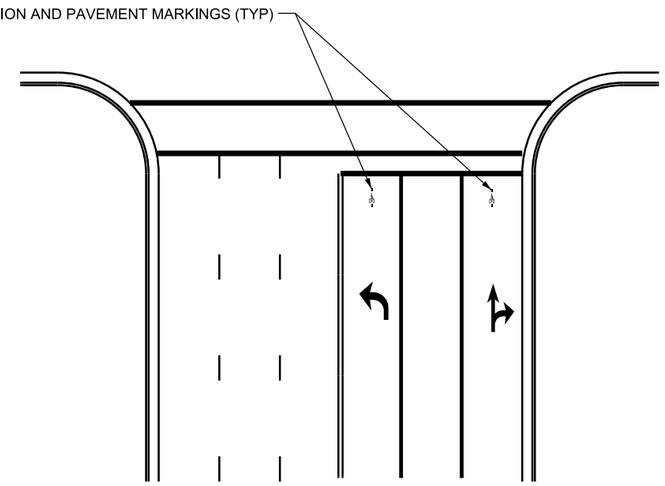


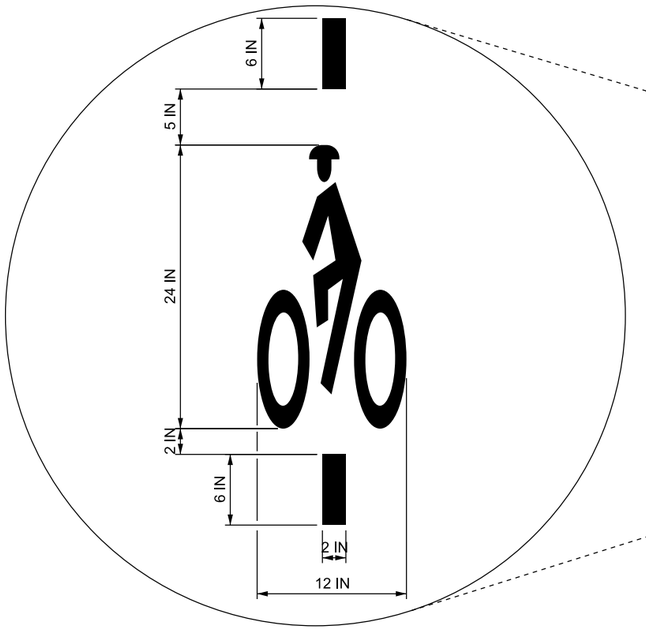
LEFT TURN AND RIGHT TURN LANES



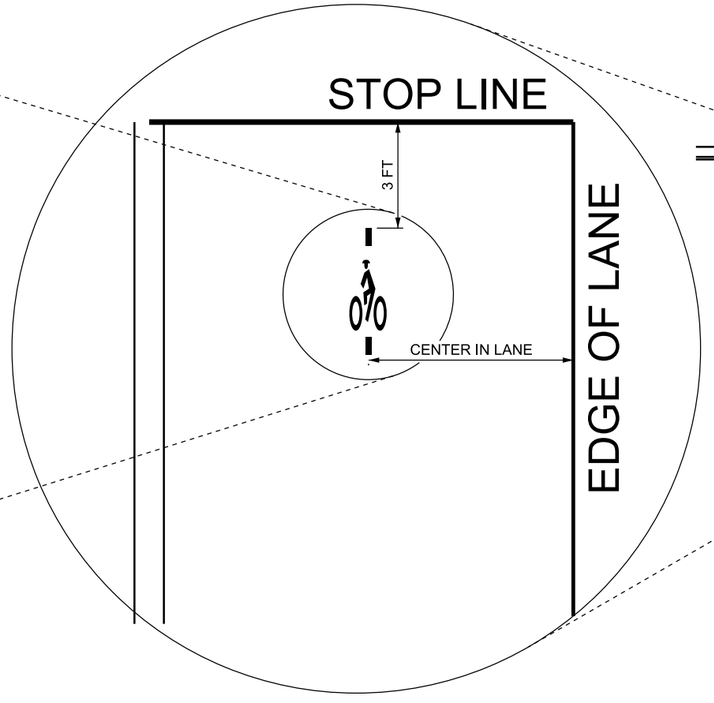
DUAL LEFT TURN AND RIGHT TURN LANES



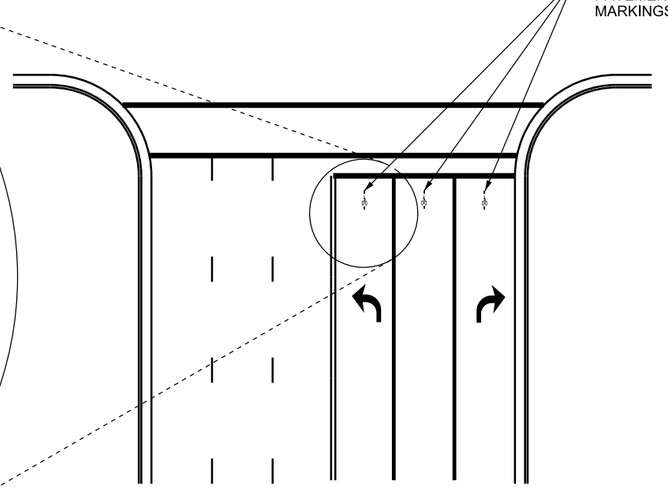
LEFT TURN AND SHARED THROUGH/RIGHT TURN LANES



BICYCLE DETECTOR PAVEMENT MESSAGE



LOCATION OF BICYCLE DETECTOR IN LANE



LEFT TURN AND NO TURN ON RED RIGHT TURN LANES

DESIGN NOTES:

A. INSTALL BICYCLE DETECTOR PAVEMENT MARKINGS ONLY ON ACTUATED APPROACHES WHERE DETECTION IS THE ONLY MECHANISM USED TO CALL THE SIGNAL PHASE (WHERE IT IS NECESSARY FOR THE CYCLISTS TO STOP AND WAIT IN CERTAIN LOCATIONS TO ACTIVATE THE TRAFFIC SIGNAL). CONTACT THE REGION SIGNAL ENGINEER FOR SPECIFICS ON WHICH DETECTORS ARE USED TO CALL THE PHASES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN. 01, 2017 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN. 01, 2017 — DATE

DEPUTY DIRECTOR

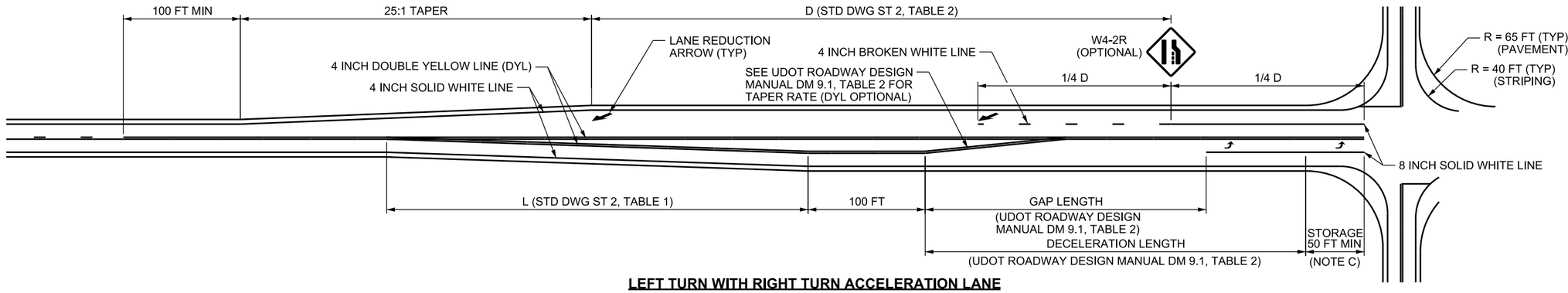
LOCATION OF BICYCLE DETECTOR PAVEMENT MESSAGES AT INTERSECTION

STANDARD DRAWING TITLE

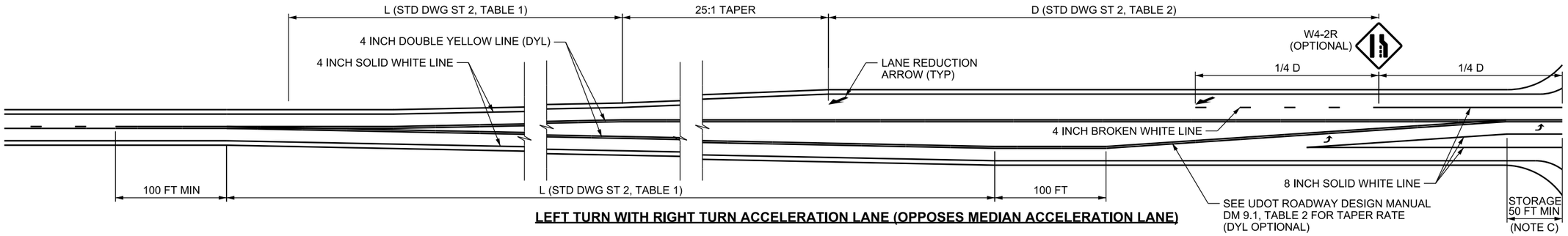
STD. DWG. NO.

ST 12

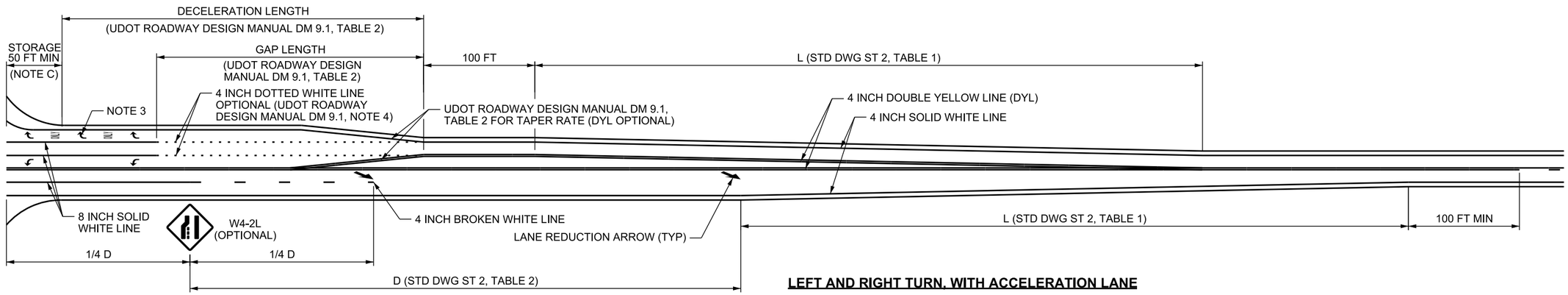
08-AUG-2019 DGN File: G:\Standardsandspecssection\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\Design - Tiffany Pocock\3-AgendaVersion\ST12_DELETION.dgn



LEFT TURN WITH RIGHT TURN ACCELERATION LANE



LEFT TURN WITH RIGHT TURN ACCELERATION LANE (OPPOSES MEDIAN ACCELERATION LANE)



LEFT AND RIGHT TURN, WITH ACCELERATION LANE

TABLE 1				
MINIMUM LEVELS FOR INSTALLATION OF TURN AND ACCELERATION LANES ON TWO LANE ROADS				
SPEED	LEFT TURN LANE	RIGHT TURN LANE	LEFT TURN ACCELERATION LANE	RIGHT TURN ACCELERATION LANE
40 MPH AND LESS	25 VPH	50 VPH	*	*
45 TO 55 MPH	10 VPH	25 VPH	*	50 VPH
60 MPH AND GREATER	5 VPH	10 VPH	**	25 VPH

* OPTIONAL FOR 50 MPH AND LESS. FOR 55 MPH, AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
** AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
VPH= VEHICLES PER HOUR IN ANY ONE HOUR PERIOD IN PASSENGER CAR EQUIVALENTS.

DESIGN NOTES:

A. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS AND THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN.

B. CONFIGURATIONS SHOWN MAY VARY BASED ON LOCATION OF WIDENING (EQUAL WIDENING TO BOTH SIDES AS OPPOSED TO ONE SIDE OF THE EXISTING ROAD OR ANOTHER, FOR EXAMPLE).

C. INCREASE VEHICLE STORAGE LENGTH AS DETERMINED BY ENGINEERING STUDY OR REGION TRAFFIC ENGINEER.

D. DESIGN ALL EDGES OF PAVEMENT AND STOP LINE / RAISED MEDIAN OFFSETS FOR DESIGN VEHICLE (WB-67, UNLESS APPROVED BY REGION TRAFFIC ENGINEER). DESIGN STRIPING FOR STANDARD (P) DESIGN VEHICLES.

NOTES:

1. MATCH THE EXISTING OUTSIDE SHOULDER WIDTH (4 FT MIN) FOR ACCELERATION AND DECELERATION LANES (INCLUDING TAPERS). USE TABLE 1 ON UDOT ROADWAY DESIGN MANUAL DM 9.1 FOR ALL OTHER SHOULDER WIDTHS.
2. PROVIDE A TWO-WAY LEFT TURN LANE CONNECTING ADJACENT ACCESS POINTS WHEN THEIR TAPERS OVERLAP, OR AS DIRECTED BY THE REGION TRAFFIC ENGINEER.
3. PLACE RIGHT TURN ARROWS AND "ONLY" MARKINGS WHEN AN OPPOSING RIGHT TURN ACCELERATION OR A MANDATORY LANE DROP IS USED. SEE STD DWG ST 6 FOR PAVEMENT MESSAGE PLACEMENT.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

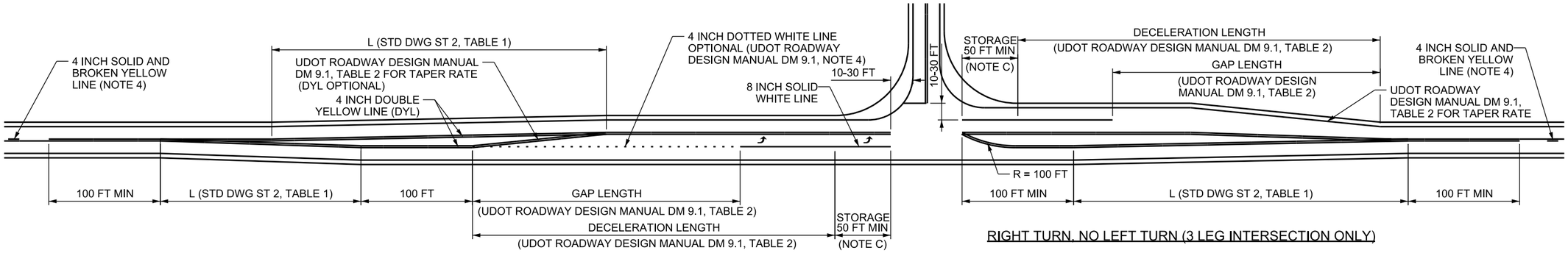
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG 30, 2018 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 30, 2018 — DATE
DEPUTY DIRECTOR

TWO-LANE INTERSECTION PAVEMENT MARKINGS (SHEET 1 OF 2)

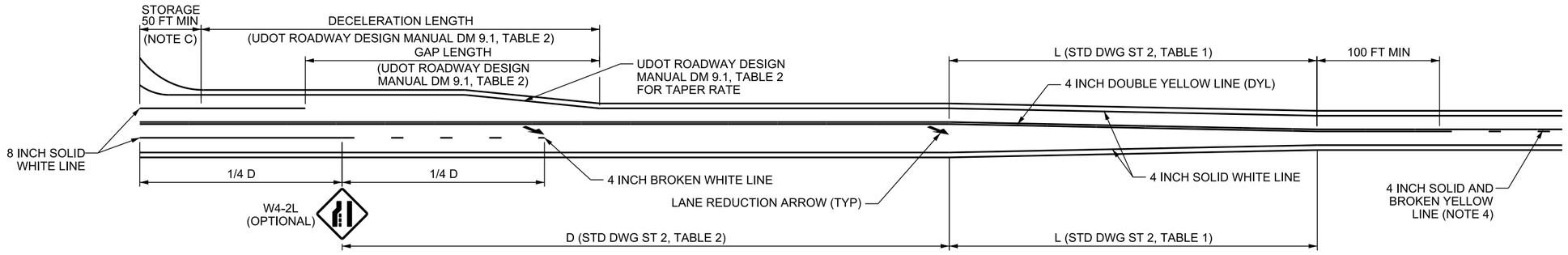
STANDARD DRAWING TITLE

STD. DWG. NO.
ST 13



LEFT TURN

RIGHT TURN, NO LEFT TURN (3 LEG INTERSECTION ONLY)



RIGHT TURN, NO LEFT TURN, WITH MEDIAN ACCELERATION LANE

TABLE 1				
MINIMUM LEVELS FOR INSTALLATION OF TURN AND ACCELERATION LANES ON TWO LANE ROADS				
SPEED	LEFT TURN LANE	RIGHT TURN LANE	LEFT TURN ACCELERATION LANE	RIGHT TURN ACCELERATION LANE
40 MPH AND LESS	25 VPH	50 VPH	*	*
45 TO 55 MPH	10 VPH	25 VPH	*	50 VPH
60 MPH AND GREATER	5 VPH	10 VPH	**	25 VPH

* OPTIONAL FOR 50 MPH AND LESS. FOR 55 MPH, AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
** AS REQUIRED BY THE REGION TRAFFIC ENGINEER.
VPH= VEHICLES PER HOUR IN ANY ONE HOUR PERIOD IN PASSENGER CAR EQUIVALENTS.

DESIGN NOTES:

A. USE THE AASHTO A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS AND THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR DESIGN OF ROADWAY ELEMENTS NOT SHOWN.

B. CONFIGURATIONS SHOWN MAY VARY BASED ON LOCATION OF WIDENING (EQUAL WIDENING TO BOTH SIDES AS OPPOSED TO ONE SIDE OF THE EXISTING ROAD OR ANOTHER, FOR EXAMPLE).

C. INCREASE VEHICLE STORAGE LENGTH AS DETERMINED BY ENGINEERING STUDY OR REGION TRAFFIC ENGINEER.

D. DESIGN ALL EDGES OF PAVEMENT AND STOP LINE / RAISED MEDIAN OFFSETS FOR DESIGN VEHICLE (WB-67, UNLESS APPROVED BY REGION TRAFFIC ENGINEER). DESIGN STRIPING FOR STANDARD (P) DESIGN VEHICLES.

NOTES:

1. MATCH THE EXISTING OUTSIDE SHOULDER WIDTH (4 FT MIN) FOR ACCELERATION AND DECELERATION LANES (INCLUDING TAPERS). USE TABLE 1 ON UDOT ROADWAY DESIGN MANUAL DM 9.1 FOR ALL OTHER SHOULDER WIDTHS.
2. PROVIDE A TWO-WAY LEFT TURN LANE CONNECTING ADJACENT ACCESS POINTS WHEN THEIR TAPERS OVERLAP, OR AS DIRECTED BY THE REGION TRAFFIC ENGINEER.
3. PLACE RIGHT TURN ARROWS AND "ONLY" MARKINGS WHEN AN OPPOSING RIGHT TURN ACCELERATION OR A MANDATORY LANE DROP IS USED. SEE STD DWG ST 6 FOR PAVEMENT MESSAGE PLACEMENT.
4. PLACE PASSING ZONE STRIPING PER STD DWG ST 1 AND ST 2.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG 30, 2018 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG 30, 2018 — DATE
DEPUTY DIRECTOR

TWO-LANE INTERSECTION PAVEMENT MARKINGS (SHEET 2 OF 2)

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 14

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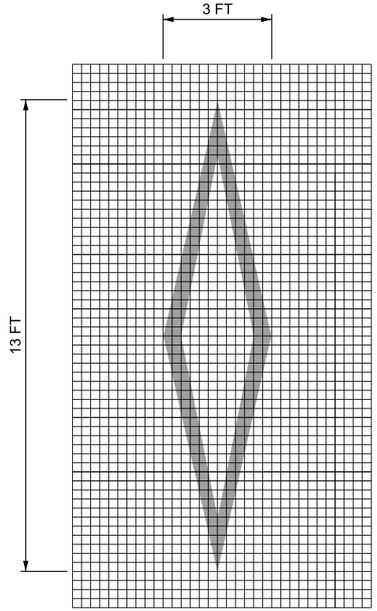
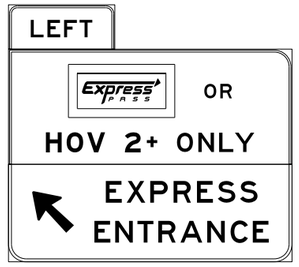


HOV LANE SYMBOL PAVEMENT MARKING DETAIL

NOTES 1 AND 2

RS3-48B
EXPRESS
ELECTRONIC
TOLL

Ⓐ



ES8-7
EXPRESS
INTERMEDIATE
DIRECTION

Ⓑ

RS3-44B
EXPRESS
DIRECTION

Ⓒ

RS3-41
LEFT LANE
HOV-TOLL
IS 2+ OR TOLL

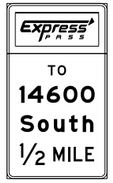
Ⓓ

RS3-40b
FINE IMPOSED
FOR HOV-TOLL
VIOLATION

Ⓔ

RS3-40d
DO NOT CROSS
DOUBLE
WHITE LINE

Ⓕ



ES8-6
EXPRESS EGRESS
FRACTIONAL MILE
ADVANCE

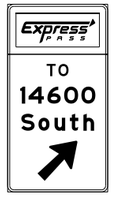
Ⓖ

RS12-9a
NO VEHICLES OVER
12000 GVW
IN LEFT 2 LANES

Ⓗ

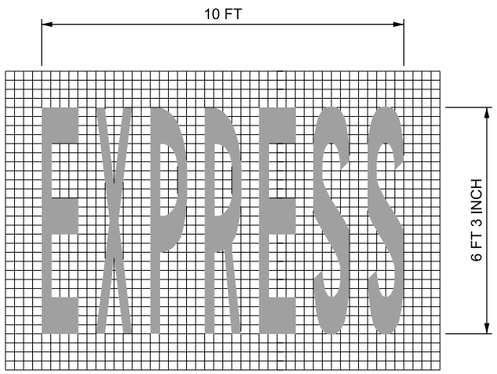
RS12-10a
NO VEHICLES
TOWING TRAILERS
IN LEFT 2 LANES

Ⓘ



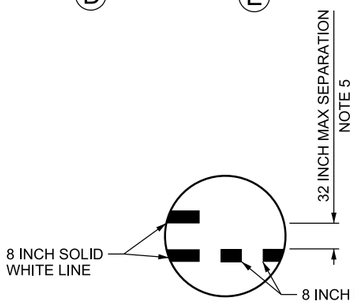
ES8-5
EXPRESS
EGRESS
DIRECTION

Ⓙ



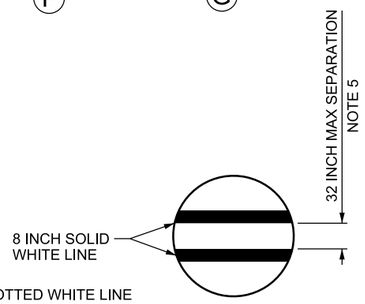
EXPRESS PAVEMENT MARKING DETAIL

NOTES 1 AND 2



STRIPING DETAIL FOR TRANSITION FROM PROHIBITED MOVEMENT TO ACCESS OPENING

NOTES 4, 5



STRIPING DETAIL FOR PROHIBITED MOVEMENTS

NOTE 5

NOTES:

1. PLACE EXPRESS PAVEMENT MARKING AND HOV LANE SYMBOL PAVEMENT MARKING BEFORE EGRESS, ONCE IN THE ACCESS OPENING, AFTER THE ENTRANCE, AND EVERY 1/4 MILE IN THE PREFERENTIAL LANE.
2. PLACE THE HOV LANE SYMBOL PAVEMENT MARKING 100 FT AFTER THE EXPRESS PAVEMENT MARKING (TYPICAL).
3. PLACE BARRIER MOUNTED SIGNS BACK TO BACK WHERE APPLICABLE. PLACE SIGNS PERPENDICULAR TO TRAFFIC UNLESS THE SIGN IS WIDER THAN 4 FT. SKEW SIGNS WIDER THAN 4 FT UP TO 45 DEGREES SO THE SIGN DOES NOT PROJECT MORE THAN 1 FT BEYOND THE OUTER EDGE OF THE BARRIER.
4. PLACE 8 INCH DOTTED WHITE LINE AS THE EXTENSION OF THE 8 INCH SOLID WHITE LINE ADJACENT TO THE GENERAL PURPOSE LANE.
5. USE 32 INCH (INSIDE TO INSIDE) SEPARATION BETWEEN DOUBLE SOLID WHITE LINES. USE OF LESS THAN 32 INCH SEPARATION (8 INCH MINIMUM) IS ALLOWED ONLY UPON APPROVAL OF CENTRAL TRAFFIC AND SAFETY.
6. SEE THE UTAH STANDARD HIGHWAY SIGNS SUPPLEMENT FOR LAYOUT AND SIGN SIZE.
7. STREET NAMES SHOWN ARE FOR EXAMPLE ONLY.

REVISIONS

NO.	DATE	APPR.	REMARKS

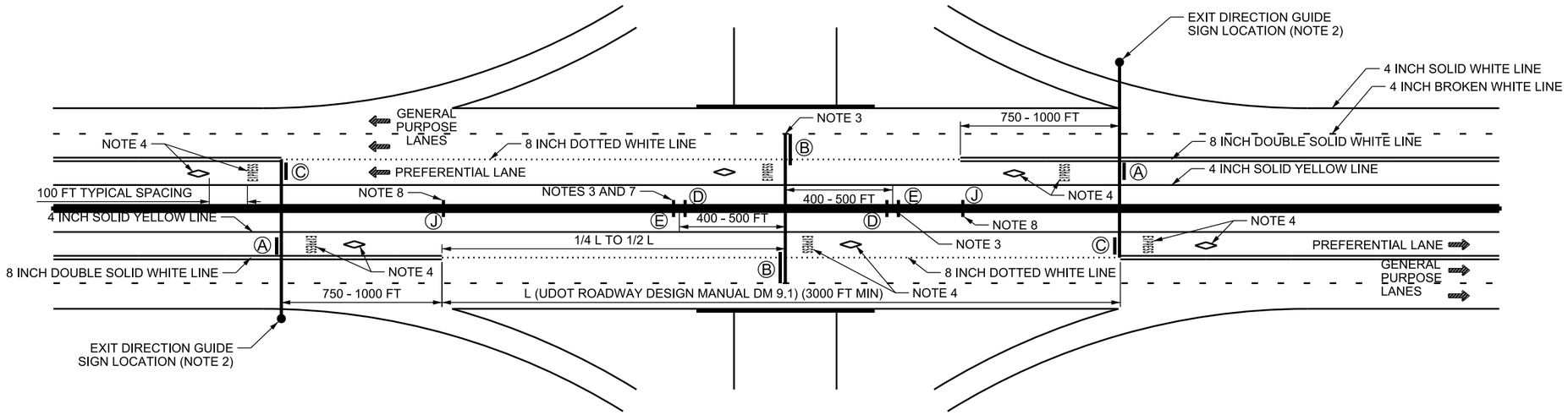
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN. 01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN.01, 2017 DATE
DEPUTY DIRECTOR

PREFERENTIAL LANE SIGNING AND PAVEMENT MARKING DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 15



PREFERENTIAL LANE ACCESS OPENING DETAILS

LEGEND

- BARRIER OR POST MOUNTED SIGN
- OVERHEAD MOUNTED SIGN
- Ⓐ SIGN IDENTIFICATION CODE (SEE STD DWG ST 15)
- HOV SYMBOL PAVEMENT MARKING
- EXPRESS — EXPRESS LANE PAVEMENT MARKING
- DIRECTION OF TRAFFIC

NOTES:

1. SEE STD DWG ST 15 FOR SIGN AND PAVEMENT MARKING DETAILS.
2. ALIGN EXPRESS ELECTRONIC TOLL (RS3-48b) SIGN WITH EXIT DIRECTION GUIDE SIGN WHERE POSSIBLE. EXIT DIRECTION SIGN MUST BE LOCATED AT THE THEORETICAL GORE OR AT THE POINT OF RAMP WIDENING, DEPENDING ON EXIT RAMP CONFIGURATION.
3. ALIGN PREFERENTIAL LANE ACCESS POINTS FOR OPPOSING DIRECTIONS WHEN POSSIBLE SUCH THAT THE SIGN SUPPORTS CAN BE USED IN COMMON.
4. PLACE EXPRESS PAVEMENT MARKING AND HOV LANE SYMBOL PAVEMENT MARKING BEFORE EGRESS, ONCE IN THE ACCESS OPENING, AFTER THE ENTRANCE, AND EVERY 1/4 MILE IN THE PREFERENTIAL LANE.
5. PLACE THE HOV LANE SYMBOL PAVEMENT MARKING 100 FT AFTER THE EXPRESS PAVEMENT MARKING (TYPICAL).
6. PLACE BARRIER MOUNTED SIGNS BACK TO BACK WHERE APPLICABLE. PLACE SIGNS PERPENDICULAR TO TRAFFIC UNLESS THE SIGN IS WIDER THAN 4 FT. SKEW SIGNS WIDER THAN 4 FT UP TO 45 DEGREES SO THE SIGN DOES NOT PROJECT MORE THAN 1 FT BEYOND THE OUTER EDGE OF THE BARRIER.
7. PLACE SIGN IDENTIFICATION CODE SIGNS D AND E BACK-TO-BACK WHERE POSSIBLE.
8. PLACE THE EXPRESS EGRESS DIRECTION (ES8-5) SIGN OPPOSITE THE END OF THE DOUBLE SOLID WHITE LINE, AT THE BEGINNING OF THE ACCESS OPENING.
9. USE A PREFERENTIAL LANE WIDTH OF 11 FT MINIMUM. USE A SEPARATION WIDTH OF 4 FT BETWEEN THE PREFERENTIAL LANE AND GENERAL PURPOSE LANE ONE (SEE STD DWG ST 15, STRIPING DETAILS). USE A GENERAL PURPOSE LANE ONE WIDTH OF 11 FT MINIMUM. USE A LANE WIDTH OF 12 FT FOR ALL OTHER LANES, INCLUDING AUXILIARY LANES (UNLESS OTHERWISE APPROVED BY REGION TRAFFIC ENGINEER).
10. SEE STD DWG ST 1 FOR PAVEMENT MARKING LINE DIMENSIONS.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

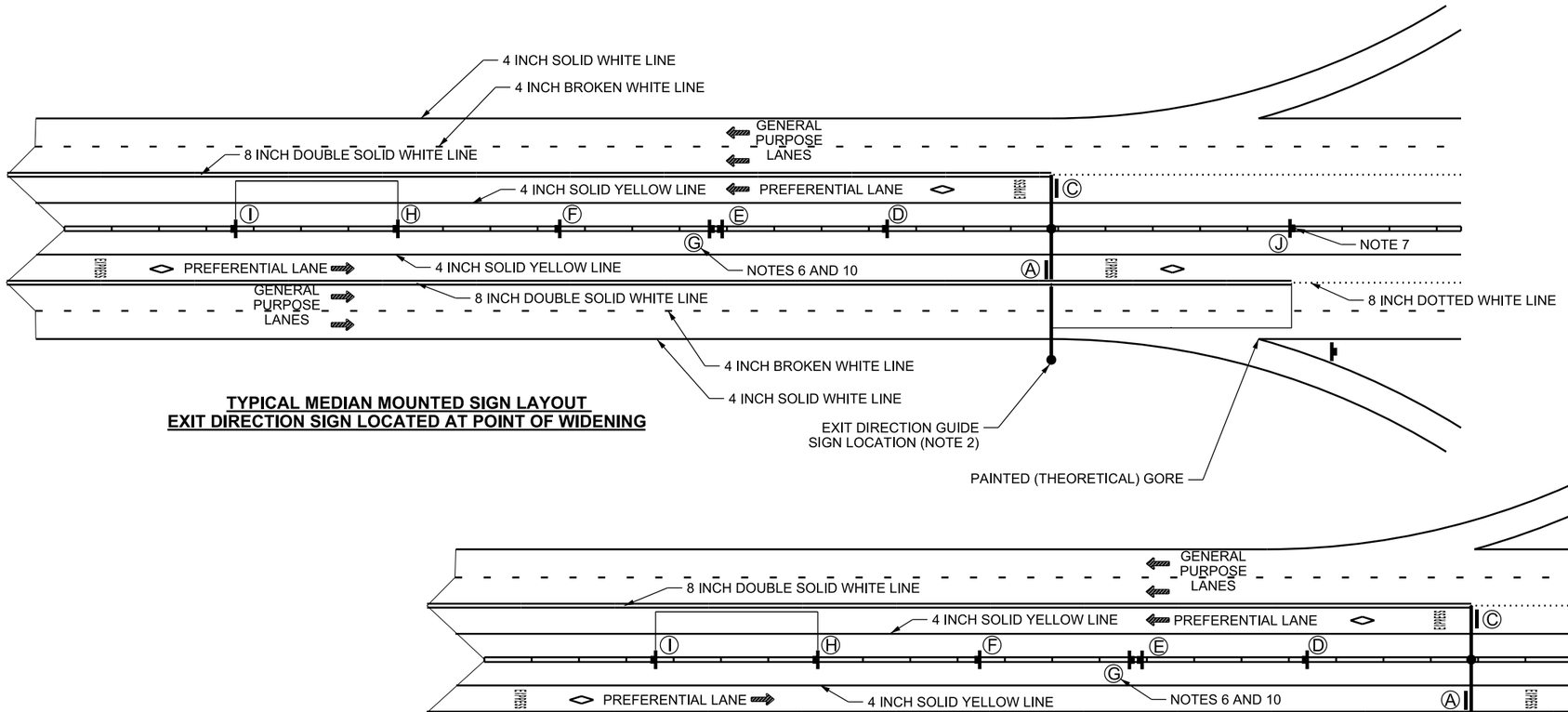
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	AUG 30, 2018	
CHAIRMAN STANDARDS COMMITTEE	DATE	
APPROVED	AUG 30, 2018	
DEPUTY DIRECTOR	DATE	

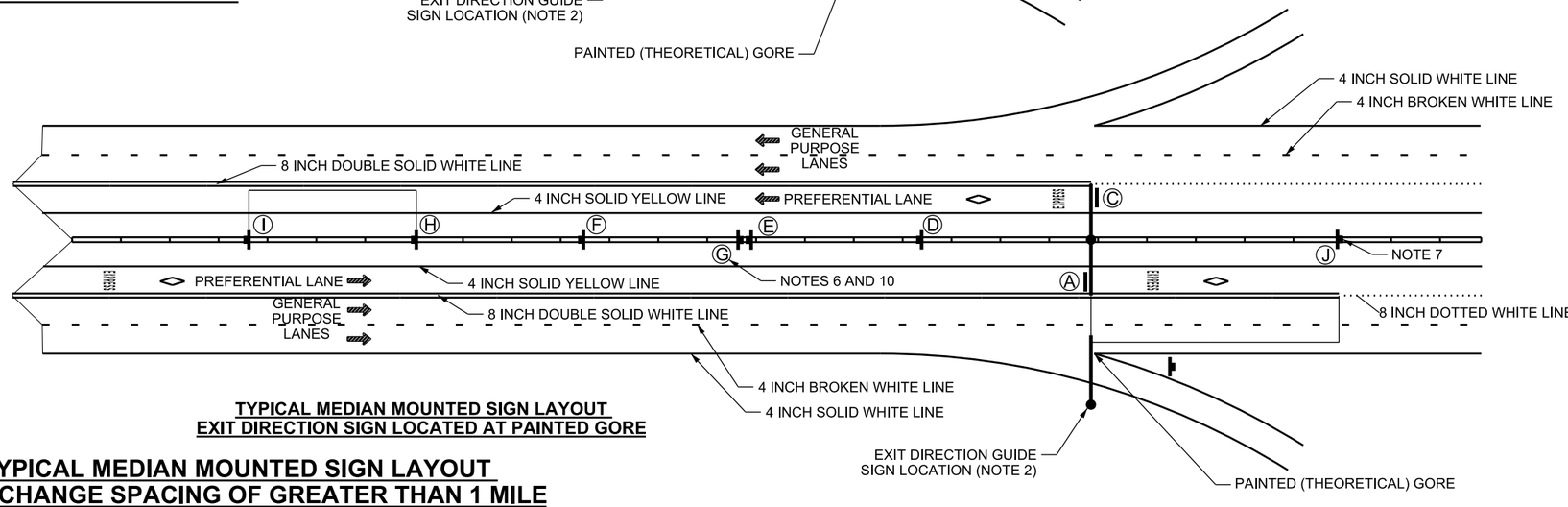
PREFERENTIAL LANE ACCESS OPENING DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 16



TYPICAL MEDIAN MOUNTED SIGN LAYOUT
EXIT DIRECTION SIGN LOCATED AT POINT OF WIDENING



TYPICAL MEDIAN MOUNTED SIGN LAYOUT
EXIT DIRECTION SIGN LOCATED AT PAINTED GORE

TYPICAL MEDIAN MOUNTED SIGN LAYOUT INTERCHANGE SPACING OF GREATER THAN 1 MILE ACCESS OPENING TO ACCESS OPENING

LEGEND

- BARRIER OR POST MOUNTED SIGN
- OVERHEAD MOUNTED SIGN
- Ⓐ SIGN IDENTIFICATION CODE (SEE STD DWG ST 15)
- HOV SYMBOL PAVEMENT MARKING
- EXPRESS LANE PAVEMENT MARKING
- DIRECTION OF TRAFFIC

NOTES:

1. SEE STD DWG ST 15 FOR SIGN AND PAVEMENT MARKING DETAILS.
2. ALIGN EXPRESS ELECTRONIC TOLL (RS3-48b) SIGN WITH EXIT DIRECTION GUIDE SIGN WHERE POSSIBLE. EXIT DIRECTION SIGN MAY BE LOCATED AT THE THEORITICAL GORE OR AT THE POINT OF RAMP WIDENING, DEPENDING ON EXIT RAMP CONFIGURATION.
3. PLACE EXPRESS PAVEMENT MARKING AND HOV LANE SYMBOL PAVEMENT MARKING BEFORE EGRESS, ONCE IN THE ACCESS OPENING, AFTER THE ENTRANCE, AND EVERY 1/4 MILE IN THE PREFERENTIAL LANE.
4. PLACE THE HOV LANE SYMBOL PAVEMENT MARKING 100 FT AFTER THE EXPRESS PAVEMENT MARKING (TYPICAL).
5. PLACE BARRIER MOUNTED SIGNS BACK TO BACK WHERE APPLICABLE. PLACE SIGNS PERPENDICULAR TO TRAFFIC UNLESS THE SIGN IS WIDER THAN 4 FT. SKEW SIGNS WIDER THAN 4 FT UP TO 45 DEGREES SO THE SIGN DOES NOT PROJECT MORE THAN 1 FT BEYOND THE OUTER EDGE OF THE BARRIER.
6. PLACE THE EXPRESS EGRESS FRACTIONAL MILE ADVANCE (ES8-6) SIGN 1/2 MILE BEFORE THE END OF THE DOUBLE SOLID WHITE LINE. LOCATION MAY VARY FROM THAT SHOWN ON THE DETAIL TO ACHIEVE REQUIRED DISTANCE.
7. PLACE THE EXPRESS EGRESS DIRECTION (ES8-5) SIGN OPPOSITE THE END OF THE DOUBLE SOLID WHITE LINE, AT THE BEGINNING OF THE ACCESS OPENING.
8. USE A PREFERENTIAL LANE WIDTH OF 11 FT MINIMUM. USE A SEPARATION WIDTH OF 4 FT BETWEEN THE PREFERENTIAL LANE AND GENERAL PURPOSE LANE ONE (SEE STD DWG ST 15, STRIPING DETAILS). USE A GENERAL PURPOSE LANE ONE WIDTH OF 11 FT MINIMUM. USE A LANE WIDTH OF 12 FT FOR ALL OTHER LANES, INCLUDING AUXILIARY LANES.
9. SPACE ALL POST ACCESS OPENING SIGNS (SIGN IDENTIFICATION CODES D, E, F, G, H, AND I) AT A TYPICAL DISTANCE OF 800 FT.
10. PLACE SIGN IDENTIFICATION CODE SIGNS E AND G BACK-TO-BACK WHERE POSSIBLE.
11. SEE STD DWG ST 01 FOR PAVEMENT MARKING LINE DIMENSIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

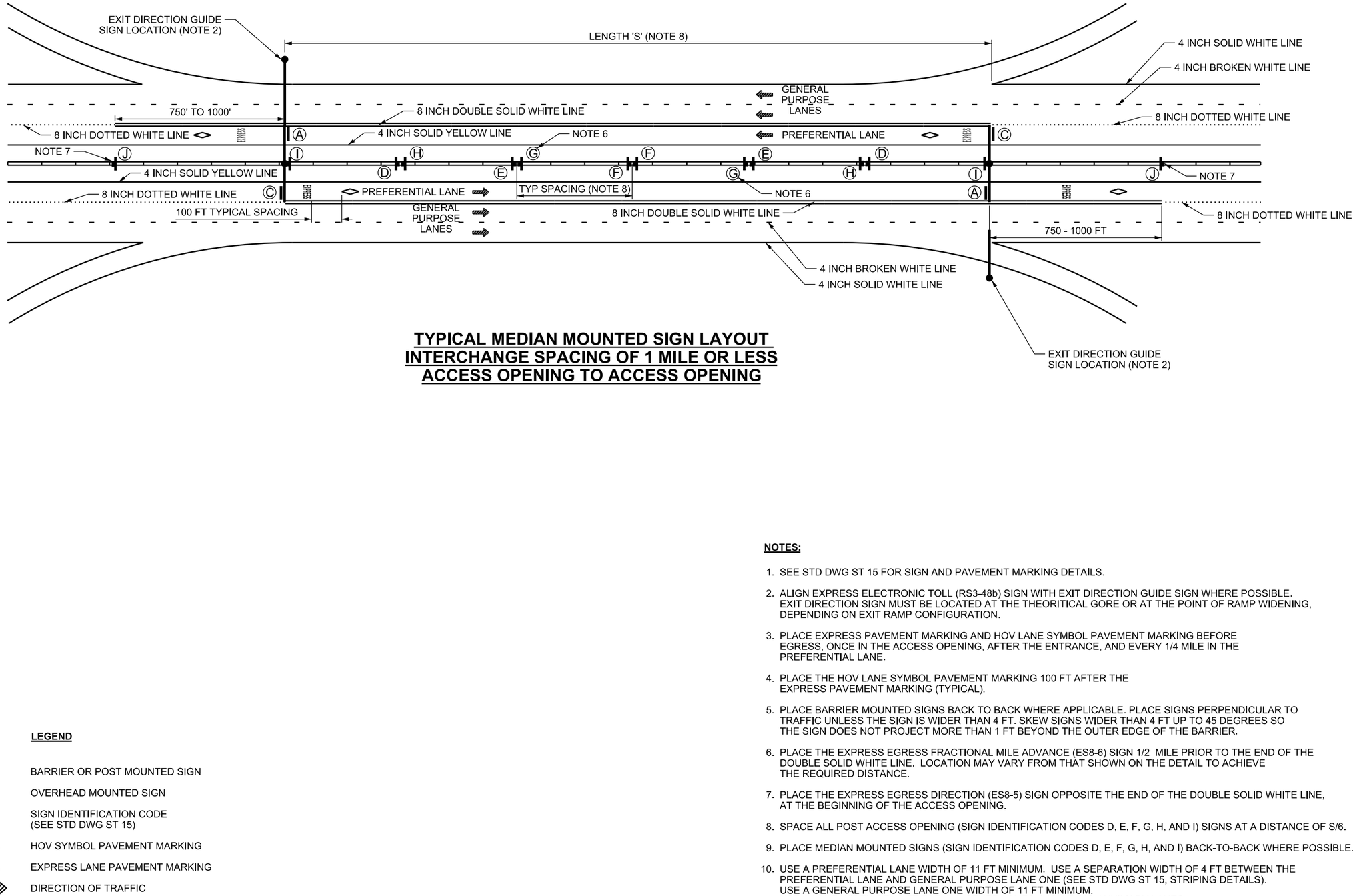
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN. 01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN. 01, 2017 DATE
DEPUTY DIRECTOR

PREFERENTIAL LANE
MEDIAN SIGNING
SPACING GREATER
1 MILE

STANDARD DRAWING TITLE

STD. DWG. NO.
ST 17



TYPICAL MEDIAN MOUNTED SIGN LAYOUT
INTERCHANGE SPACING OF 1 MILE OR LESS
ACCESS OPENING TO ACCESS OPENING

LEGEND

- BARRIER OR POST MOUNTED SIGN
- OVERHEAD MOUNTED SIGN
- Ⓐ SIGN IDENTIFICATION CODE (SEE STD DWG ST 15)
- HOV SYMBOL PAVEMENT MARKING
- EXPRESS EXPRESS LANE PAVEMENT MARKING
- DIRECTION OF TRAFFIC

NOTES:

1. SEE STD DWG ST 15 FOR SIGN AND PAVEMENT MARKING DETAILS.
2. ALIGN EXPRESS ELECTRONIC TOLL (RS3-48b) SIGN WITH EXIT DIRECTION GUIDE SIGN WHERE POSSIBLE. EXIT DIRECTION SIGN MUST BE LOCATED AT THE THEORITICAL GORE OR AT THE POINT OF RAMP WIDENING, DEPENDING ON EXIT RAMP CONFIGURATION.
3. PLACE EXPRESS PAVEMENT MARKING AND HOV LANE SYMBOL PAVEMENT MARKING BEFORE EGRESS, ONCE IN THE ACCESS OPENING, AFTER THE ENTRANCE, AND EVERY 1/4 MILE IN THE PREFERENTIAL LANE.
4. PLACE THE HOV LANE SYMBOL PAVEMENT MARKING 100 FT AFTER THE EXPRESS PAVEMENT MARKING (TYPICAL).
5. PLACE BARRIER MOUNTED SIGNS BACK TO BACK WHERE APPLICABLE. PLACE SIGNS PERPENDICULAR TO TRAFFIC UNLESS THE SIGN IS WIDER THAN 4 FT. SKEW SIGNS WIDER THAN 4 FT UP TO 45 DEGREES SO THE SIGN DOES NOT PROJECT MORE THAN 1 FT BEYOND THE OUTER EDGE OF THE BARRIER.
6. PLACE THE EXPRESS EGRESS FRACTIONAL MILE ADVANCE (ES8-6) SIGN 1/2 MILE PRIOR TO THE END OF THE DOUBLE SOLID WHITE LINE. LOCATION MAY VARY FROM THAT SHOWN ON THE DETAIL TO ACHIEVE THE REQUIRED DISTANCE.
7. PLACE THE EXPRESS EGRESS DIRECTION (ES8-5) SIGN OPPOSITE THE END OF THE DOUBLE SOLID WHITE LINE, AT THE BEGINNING OF THE ACCESS OPENING.
8. SPACE ALL POST ACCESS OPENING (SIGN IDENTIFICATION CODES D, E, F, G, H, AND I) SIGNS AT A DISTANCE OF S/6.
9. PLACE MEDIAN MOUNTED SIGNS (SIGN IDENTIFICATION CODES D, E, F, G, H, AND I) BACK-TO-BACK WHERE POSSIBLE.
10. USE A PREFERENTIAL LANE WIDTH OF 11 FT MINIMUM. USE A SEPARATION WIDTH OF 4 FT BETWEEN THE PREFERENTIAL LANE AND GENERAL PURPOSE LANE ONE (SEE STD DWG ST 15, STRIPING DETAILS). USE A GENERAL PURPOSE LANE ONE WIDTH OF 11 FT MINIMUM. USE A LANE WIDTH OF 12 FT FOR ALL OTHER LANES, INCLUDING AUXILIARY LANES.
11. SEE STD DWG ST 1 FOR PAVEMENT MARKING LINE DIMENSIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN.01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN.01, 2017 DATE
DEPUTY DIRECTOR

PREFERENTIAL LANE
MEDIAN SIGNING
SPACING EQUAL TO OR
LESS THAN 1 MILE
STANDARD DRAWING TITLE

STD. DWG. NO.
ST 18

Standards Committee Submittal Sheet

Name of Preparer: Bin Shi, Tim Wozab, Bill Lawrence, Scott Andrus

Title/Position of Preparer: Implementation Engineer, APL Coordinator, Director Materials and Pavements, State Materials Engineer

Specification/Drawing/Item Title: 1) Materials Quality Requirements 2) Aggregate Source Control 3) Full Depth Slab Replacement for Concrete Pavements 4) Concrete Slab Jacking

Specification/Drawing Number: 01455, 01457, 02753, 02755

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**
There are two reasons for the changes:

1) To add the Approved Products List (APL) as the required method of approval for designated materials as identified in the applicable technical specification. This will reduce the paperwork currently required for those manufactured products covered by the change making for a more efficient process as well as subjecting those items to a more comprehensive review of qualifications.

2) Create a new Standard Specification to be placed in the General Specifications to handle the Aggregate Source requirements related to

permits for use, maintenance, and clean-up formerly covered in 01455 1.5 A, B, C, 1.8, 1.9, and 1.10.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications.
There will be no changes in Measurement and Payment.

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation.
This will change acceptance and documentation for the items impacted. It will make the documentation process simpler and reduce paperwork. Rather than a Certificate of Compliance or Manufacturer's Data Sheet with the supporting documents they require the Contractor to submit one APL Compliance form.

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change. Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those contacted in paragraph "C" above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements
No changes.

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.)
No changes.

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section's publishing process.**

Electronic notification will be sent to affected Construction and Materials personnel.

4. What additional systems and documents need modification to reflect this change?
For those items that are designated for this method the APL Compliance form will be required rather than a Certificate of Compliance or Manufacturer's Data Sheet and Installation Instructions with the accompanying paperwork they require.

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor's overhead or mobilization).
This will likely decrease the cost to contractors/suppliers as they will not have the submittal requirements for each project after the initial APL review and approval. Additionally, it will save time and money for the UDOT Construction Crews.

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming).
None.

3. Life cycle cost.
NA

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**

It will reduce the amount of paperwork and time currently required by the contractor/supplier to provide the required documentation as well as eliminating the time needed by the Engineer to review and approve that documentation.

H. Safety Impacts?

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	Timestamp	RESPONSE BY
dlahusen@avenueconsultants.com	ACEC	02911M	SECTION 02911M - HYDRAULIC EROSION CONTROL PRODUCTS: Section 1.5.A - Change "Approve" to "Approved"	Changed	7/29/2019 17:07:22	Scott Andrus, Bin Shi, Tim Wozab
betty@wadsco.com	AGC	General	No comments received from AGC member. Largest concern will be about lack of options if approved products are limited or not available.	This issue is recognized and Central Materials will work to avoid.	7/29/2019 19:02:32	Scott Andrus, Bin Shi, Tim Wozab
btownsend@utah.gov	Bill Townsend	NA	No Comment		7/29/2019 17:01:50	
branden@utah.gov	Branden Anderson	materials Spec Submittal	No comment		7/30/2019 12:20:09	
brettslater@utah.gov	Brett Slater	Materials	No Comments		7/31/2019 11:21:28	
cmason-hill@utah.gov	Charles Mason-Hill	All	No Comment		8/1/2019 10:20:59	
dpage@utah.gov	Danny Page	01455, 01457, 01571M, 02376M, 02753M	No Comments		7/18/2019 13:42:41	
dfriant@utah.gov	Daryl Friant	Materials	No Comments		7/19/2019 14:37:19	
russell.robertson@dot.gov	FHWA	Materials Specifications	No comments.		7/30/2019 6:43:33	
fdoehring@utah.gov	Fred Doehring	All	No comments		7/30/2019 14:44:23	
gsearle@utah.gov	Greg Searle	Materials	No comments		8/1/2019 15:45:27	
jcorney@utah.gov	James Corney	Submittal Sheet	Changes are listed as Priority 3. This would give suppliers that are not on the APL very little time to get their products onto the APL. We need to provide enough of a grace period as to allow the suppliers enough time to obtain independent lab tests and submit to the APL for review.	The intent is for this change to be effective on all projects for the 2020 construction season. A Priority 3 is felt to be the most appropriate as it will become effective around September 27 and likely will not be incorporated into any projects beginning any sooner than March/April of 2020. This should be sufficient time for the suppliers/contractors to get products onto the APL.	7/25/2019 10:42:43	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	Submittal Sheet	The submittal claims that moving to the APL will reduce contractor costs, but restricting to the APL limits the products that the contractor is able to use while not providing the contractor any means to get their desired product on the APL as it is up to the supplier to initiate that process. Limiting access to products does not usually reduce cost. Additionally, the cost of submitting the paperwork is likely very minimal, as the contractor already has the paperwork for preferred products on hand. If the APL was a significant cost savings, it would already be used since it is currently an available means to expedite paperwork.	It is true the contractors likely have the paperwork required for a CofC or Manufacturer Data Sheet (MDS)filed but it will still alleviate having to turn that package into the RE prior to work and the RE reviewing and approving. Central Materials feels the APL process results in a better more comprehensive review than the CofC or MDS as it will be reviewed by the author of the governing specification.	7/25/2019 10:44:31	Scott Andrus, Bin Shi, Tim Wozab
JCorney@utah.gov	James Corney	Submittal Sheet	Please explain how this change to the APL saves UDOT construction crews time and money. If it's a matter of having digital copies of the installation instructions there are less restrictive ways to go about getting digital copies of installation instructions.	It is true the contractors likely have the paperwork required for a CofC or Manufacturer Data Sheet (MDS)filed but it will still alleviate having to turn that package into the RE prior to work and the RE reviewing and approving. Central Materials feels the APL process results in a better more comprehensive review than the CofC or MDS as it will be reviewed by the author of the governing specification.	7/25/2019 10:44:58	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	General	This change is more than our usual changes to specifications for conformance, clarity, or refinement. This is a change to how we allow work to be performed and adds roadblocks to getting products for our projects. Has this concept been taken to UDOT leadership before coming to standards?	Central Materials disagrees that this creates a roadblock. It will admittedly require more upfront effort on both Central Materials to educate and the suppliers/contractors to submit covered materials for APL approval, but once that initial process is done it will streamline the approval process and allow for more thorough review of the documentation to ensure the materials meet UDOT specifications.	7/25/2019 10:46:06	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	General	Do you think the advantages of this proposal outweigh the disadvantages? By restricting approval of products to the APL we remove a method to get valid contractor preferred products to the job by limiting acceptable products. Our APL is not a database of products that have been tested or monitored by UDOT for satisfactory performance. It is just a prescreening against the specifications. Additionally APL approval does not mean that every product associated with a specification is applicable to a project. For example Structural Concrete Repair includes 5 different product types. The selected product still needs to be confirmed by the Engineer as applicable for the project application.	Central Materials believes strongly this will be a positive move but as mentioned previously will take effort to get everyone adjusted to the new process on those effected materials. The idea is to have quality products used not quantity that the contractor can bring to the job.	7/25/2019 10:47:14	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	APL Compliance Form	APL Compliance Form needs to add specifics about materials. For example "Product is R2 material" or "Product meets ASTM C309 Type ID Class A" for Engineer review. Just satisfying the spec is not enough to describe a product for use.	The APL Compliance Form cites the technical specification and the products applied section which specified the useage. The APL itself lists the specific article for which uses that product is approved for. To better clarify and avoid confusion the governing article will be added to the compliance form alongside the technical section already listed.	7/25/2019 10:47:56	Scott Andrus, Bin Shi, Tim Wozab

jcorney@utah.gov	James Corney	Technical Specifications	Submittal should include the APL Compliance Form and associated Manufacturer Instructions. As stated on the APL site "Please Print Manufacturer Instructions along with the Compliance Form"	The Manufacturer Instructions are printed out with the APL Compliance Form as a package, this addresses the concern.	7/25/2019 10:48:25	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.4	What is the difference between "materials," "manufactured materials," "products," and "assemblies?" The "Approved Products List" is used for the approval of "manufactured materials and assemblies." While the Department prequalifies suppliers to provide "products and materials." Are these all the same thing? Can we reduce the number of terms used or provide a definition for what the differences in these things are?	We recognize the concern but feel this is an issue larger then just with this specification and will need to be dealt with from a more global approach then is within the scope of this change.	7/25/2019 10:53:59	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.5 C1c	Delete specifics which duplicate the requirement of 1.11 C2. Just require the submittal "Total cost and percent of total contract amount showing the cost of steel and iron."	Agree, change made.	7/25/2019 10:55:19	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B1	What is the purpose of notifying (in writing) the Engineer of all materials proposed for use with approval based upon manufacturer's information? When is this supposed to happen? Should this be a submittal?	Agree, change made.	7/25/2019 10:56:08	scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B1	Why is the notification only applicable to products that are approved based on manufacturer's information and not Certificates of Compliance or APL Compliance Forms?	Change made in 1.6 B, 1.7 A applies to all materials.	7/25/2019 10:57:14	scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B1a	Seems unnecessary to mention to provide submittals as required by the technical specifications. Delete?	Revised wording to make more clear.	7/25/2019 10:57:41	scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B2	Why is the APL Compliance form under 1.6 B "Approval of Materials Before Use Based on Manufacturer Information" ? Approval of a product to be on the APL is based on manufacturer's information, approval for a product to be used in a project is based on the APL Certification Form. The Specification is written to the contractor for the purpose of the project.	Revised wording to make more clear.	7/25/2019 10:58:36	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B2a	Why do we have this subparagraph? "The contract designates manufactured materials…. If listed on the APL." Seems redundant, if the technical specifications require APL then APL is required per contract.	Modifications made to make more clear.	7/25/2019 10:59:00	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B2b	For now there are still other ways to get product/material approval, some specs still allow manufacturer product data. This says that anything not on the APL will be rejected.	That is true, Central Materials feels we need to change the process and get those materials that may be more high risk approved through the APL process. Did revise the affected technical specifications and revised wording in 01455.	7/25/2019 10:59:32	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B2b	Why do we talk about rejection? Just talk about approval, products may be approved for use on a project based on a submitted, current APL Compliance Form.	See above.	7/25/2019 11:00:18	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B2	What about special provisions. Why was the limitation on special provisions deleted? I don't think we should rely on the consultant to ensure that special provisions are properly worded to require Manufacturer's product data, and not confuse the RE when, in the case of a properly worded special, the APL is not acceptable.	After much discussion on this it was felt it was clear enough that if a special provision was on the project that would apply and it was redundant/confusing to state in this specification that the special would apply.	7/25/2019 11:01:34	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B3	Do certificates of compliance belong under the "Approval of Materials Before Use Based on Manufacturer Information?"	Certificates of Compliance are incorporated in that article.	7/25/2019 11:02:20	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 B4d	Just use the acronym "APL"	Agree, change made.	7/25/2019 11:03:07	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 D	Why was "other" removed from the list: APL, Certificates of Compliance, Manufacturer's Product Data, Other?	It was relocated to include the other methods of approval used.	7/25/2019 11:03:44	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.6 D1	Paragraph refers to "method for verification for approval" this statement is referring to both "verification" (1.6 C) and "approval" (1.6 B) but those things are not associated. If this allows the Engineer to use any of the listed methods of approval of materials before use when the technical specification does not explicitly state (like the original context) then this should be moved back under 1.6 B and reworded to apply to approval before use.	Change made.	7/25/2019 11:05:21	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.7	What is a "supply source?"	A supply source is any supplier or manufacturer providing a material used on a UDOT project.	7/25/2019 11:05:42	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.7 A	Contractors need to notify the Engineer in writing of the source of every product to be used before they are delivered?	Yes the RE should be aware of products being delivered to the project and their source.	7/25/2019 11:06:25	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.7 C	The 1 year testing time-frame used to be applicable to only aggregate sources. Now it is applicable to all products, is that the intent? Even APL items assume that testing is valid for products for up to 5 years (1 year to get on the APL, 4 years on the APL).	This originally applied to aggregate only, that wording was mistakenly removed, original wording has been restored.	7/25/2019 11:07:44	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	01455: 1.8 A	"Department may inspect and test materials at…" Is a precast girder a "material?"	Good question, guess it depends on interpretation, I would consider it a finished material so subject to the governing QMP and MSTR requirements for the materials (concrete, rebar) used in its' construction.	7/25/2019 11:08:09	Scott Andrus, Bin Shi, Tim Wozab

jcorney@utah.gov	James Corney	Spec 03390	Do not include changes to 03390: Concrete Curing only includes one product that meets ASTM C1315 for Concrete Barrier applications and 3 products that meet ASTM C 309 Type ID Class A for all other applications. The remaining 7 products do not apply to the current specification and need to be removed from the APL.	Agree. Spec 03990 will not be included in this change	7/25/2019 11:10:01	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	APL for 03392	Penetrating Concrete Sealer. Only three manufacturers are represented. Is that sufficient?	There are three manufactures and four products currently on APL. But we will not include this specification in the change this time.	7/25/2019 11:10:38	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	Spec 03605	Do not include changes to 03605: Approach Slab Jacking. The APL currently has no High Density Polyurethane products for one of the acceptable approach slab jacking methods.	Agree, we will not change 03605 this time.	7/25/2019 11:11:34	Scott Andrus, Bin Shi, Tim Wozab
jcorney@utah.gov	James Corney	Spec 03924	Do not include changes to 03924: Structural Concrete Repair. The APL currently has no Type R1 repair mortars, no resins for bonding fresh concrete to existing concrete, and no Grade 1 injection adhesives.	03924 allows R3 to be used for R1 and R1. We have eight R3 products with six manufactures on APL. But we will not change 03924 this time.	7/25/2019 11:12:06	Scott Andrus, Bin Shi, Tim Wozab
jtremaine@utah.gov	Janice	Materials Spec	No Comment		7/18/2019 14:31:48	
kbarrett@utah.gov	Kelly Barrett	01455 01457 1571M 02376M 02753M 02755M 02911M 03390M 03392M 03605M 03924M 03934M	Nothing of concern		7/30/2019 9:02:35	
kentalbot@utah.gov	Ken Talbot	3924, 1.5.A	Add “for information” at the end of the sentence	The specification owner does not feel this is the right time to make the change. We will not change this specification this time.	7/30/2019 15:57:14	
kentalbot@utah.gov	Ken Talbot	3605M, 1.5.A	Add “for information” at the end of the sentence	The specification owner does not feel this is the right time to make the change. We will not change this specification this time.	7/30/2019 15:57:39	
kentalbot@utah.gov	Ken Talbot	3392M, 1.5.A	Add “for information” at the end of the sentence	The specification owner does not feel this is the right time to make the change. We will not change this specification this time.	7/30/2019 15:58:10	
kentalbot@utah.gov	Ken Talbot	3390M, 1.5.A	Add “for information” at the end of the sentence	The specification owner does not feel this is the right time to make the change. We will not change this specification this time.	7/30/2019 15:58:32	
kentalbot@utah.gov	Ken Talbot	2911M, 1.5. A	Suggest rewording sentence to the following: "Approved Products List (APL) Compliance Form for Hydraulic Erosion Control Products for information."	Changed accordingly	7/30/2019 16:00:42	
kentalbot@utah.gov	Ken Talbot	2911M, 1.5.B	Add "of" after Certificate and add “for review” at the end of the sentence	No "for review" in other submittles, decided not add. "off" added to the sentence.	7/30/2019 16:02:00	
kentalbot@utah.gov	Ken Talbot	2755M, 1.5.A	Add “for information” at the end of the sentence	To be consistent with other submittals, did not change the sentence.	7/30/2019 16:02:25	
kentalbot@utah.gov	Ken Talbot	2753M, 1.5.A	Add “for information” at the end of the sentence	To be consistent with other submittals, did not change the sentence.	7/30/2019 16:03:39	
kentalbot@utah.gov	Ken Talbot	1455, General	Don't all the specs that have a current submittal of MSD sheets need to be updated to the APL language, not just the specs submitted?	Not at this time, it is expected the number of items requiring the APL will grow which will include more currently covered by the MDS, but right now we are limiting it to those materials included in this proposed change.	7/30/2019 16:05:19	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	2376M, 1.5.A	Add “for information” at the end of the sentence	To be consistent with other submittals, did not change the sentence.	7/30/2019 16:05:56	
kentalbot@utah.gov	Ken Talbot	1571M, 1.5.A	Add “for information” at the end of the sentence	To be consistent with other submittals, did not change the sentence.	7/30/2019 16:06:19	
kentalbot@utah.gov	Ken Talbot	1457, 1.5.C	The Department already as a form that basically covers what you are requiring here and is already required at project closeout - that could be referenced here - it is form C200	Agree, Contractor directed to provide Form C-200 in 1.5 C. 2.	7/30/2019 16:09:57	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1457, 1.6 A	This is basically a repeat of 1.5.A; can the timing requirement be added to 1.5.A and 1.6.A deleted?	Feel 1.6 A covers more needed area then 1.5 A. No change.	7/30/2019 16:13:27	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1457, 1.7.A.1	consider changing quality to consistency	Feel "quality" conveys intent better than "consistency". No change	7/30/2019 21:27:08	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1457, 1.7.A.2	Is this really needed. Seems like it just adds confusion and potential conflict with the technical specs.	Agree, deleted.	7/30/2019 21:28:26	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1457, 1.7.B	Repeats 1.5.A, consider adding relevant information from 1.7.B to 1.5.A, and deleting 1.7.B.	Feel that 1.7 B may require more than 1.5 A, leave as is.	7/30/2019 21:28:57	
kentalbot@utah.gov	Ken Talbot	1457, 1.9.F	Since the RE will be providing the seed mix, the text "with grass or grasses adaptable to the area" can be deleted.	Agree, deleted.	7/30/2019 21:31:33	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455, 1.3.A	Has the UDOT MMOI been or does it need to be updated to reflect the changes made in this spec and the procedural changes described in the Standards Committee Submittal Sheet?	The MMOI has been revised and will be submitted for approval once these specification changes are approved by the Standards Committee.	7/30/2019 21:33:23	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.5.A	Delete "if required" from the end of the sentence.	Agree, change made.	7/30/2019 21:34:18	

kentalbot@utah.gov	Ken Talbot	1455, 1.5.C	Main paragraph - seems like the cost documentation should be submitted and approved prior to delivery to project site?	Current wording is, "for approval before payment and incorporation in the project..." We feel this covers adequately the concern raised. No change.	7/30/2019 21:36:11	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455, 1.5.C	Add "for review" to the end of the sentence.	"...for approval..." is required earlier in the same article. This covers the concern addressed and if "for review" were inserted could cause confusion. No change.	7/30/2019 21:36:43	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455 - General	Many places in the spec refer to pre-qualified suppliers, however the Department web site calls them Qualified Suppliers - the two places should match.	Agree, "Qualified Suppliers" will be changed to "Pre-Qualified Suppliers" on the website.	7/30/2019 21:38:18	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455, 1.6.A.1.c	This paragraph discusses suppliers who lose their qualifications during a project - What is our process to notify construction crews and contractors if one of the suppliers lose their qualified supplier status during the course of a project?	Currently when a Pre-Qualified supplier loses their qualifications they are removed from the website approved list at that time and are notified in writing. The Engineer managing that specific QMP generally lets involved parties know via email but there is no formal process. We will review this.	7/30/2019 21:40:25	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.6.B.1	What is the purpose of this section? Seems like it should be in the submittals section, or part of the APL.	Agree, also mentioned by other reviewers. Original B 1. and 1.a. deleted	7/30/2019 21:41:39	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.6.B.2	Probably need to add some language to convey the APL compliance form consists of the compliance form and the installation instructions, MSD, and any other documents related to that product in the PAL database, that are compiled into one file and then submitted.	Agreed verbiage added.	7/30/2019 21:43:20	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.6.B.2.b	what about those materials that have certs and are not the APL, will they be rejected? Are certs required for the materials that are on the APL? I didn't see a place where contractors could request a product be added to the APL What needs to be on the APL, and what needs to have a cert? How do we distinguish between the two? Should everything be on the APL?	With approval of these proposed changes; if the Technical Specification requires that a product submittal be the APL it will only be allowed for use if on the APL. The APL application process is online and accessed through the UDOT website, wording regarding this has been added in 01455 1.6 B. 1. a. As mentioned the Technical Specification will designate the required documentation for Manufactured Products based on Manufacturer Information.	7/30/2019 21:45:04	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.6.B.4.d	is this paragraph needed? What purpose does it serve? The APL compliance form does not tell the guys in the field what they need to know - see comment regarding 1.6.B.2.b	This is left from the original 01455 and we feel it is necessary in the event for some reason a material on the project is not covered by a documentation/testing process this gives the RE grounds to use any of the processes previously cited for acceptance.	7/30/2019 21:47:29	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.6.D.1	delete "for approval" from the paragraph	Deleted	7/30/2019 21:48:53	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.7.A	for everything? That seems a little much.	Yes, the RE should be apprised of where materials are coming from.	7/30/2019 21:51:30	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455, 1.7.C	should this be in the 1457 spec? Seems out of place here.	There was discussion related to that specific point. It was decided to leave this in place in 01455 as it pertains to materials quality assurance and the intent of 01457 is to address issues related to legal use of pits and cleanup rather than materials quality issues.	7/30/2019 21:52:10	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455, 1.9.D	This is already a required submittal; see 1.5.A	Agree, change made.	7/30/2019 21:52:47	
kentalbot@utah.gov	Ken Talbot	1455, 1.10.B	add the following at the end of the sentence "due the contractor for any of the following:"	Agree, change made.	7/30/2019 21:53:49	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455, 1.11.A.1	does the term "manufactured" include items that are assembled? Steel could be manufactured in the US, then assembled in Mexico or Canada - does that still meet the Buy America requirements?	My interpretation is that it does. All processes must happen in the US. This may be a question worth raising with FHWA.	7/30/2019 21:55:11	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455, 1.11.A.2.a	This should be a submittal, for information	Disagree, feel this is a closing documentation rather than submittal.	7/30/2019 21:56:57	Scott Andrus, Bin Shi, Tim Wozab
kentalbot@utah.gov	Ken Talbot	1455,1.11.A.3.c	Concrete Chairs are called out in the paragarph, is that correct?	This is correct. That is the common industry terminology for the spacers used for holding rebar, dowel bar, etc. in place.	7/30/2019 21:58:19	Scott Andrus, Bin Shi, Tim Wozab
kthornock@utah.gov	Kirk Thornock	Materials	No comments.		7/17/2019 10:44:20	
michaeladams@utah.gov	Michael A. Adams	01455, 01457, 01571M, 02376M, 02755M, 02753M, 02911M, 03390M, 03392M, 03605M, 03924M, 03934M	No Comment		7/18/2019 17:01:07	
Rferrin@utah.gov	Ryan Ferrin	01455	Make sure to fix the page numbers so that they end with "11 of 11" and not "11 of 7".	In clean form without marked up edits there are 7 pages. No change.	7/17/2019 10:07:48	Scott Andrus, Bin Shi, Tim Wozab

Rferrin@utah.gov	Ryan Ferrin	01457	No comments		7/17/2019 10:10:34	
Rferrin@utah.gov	Ryan Ferrin	01571M	Change page number at bottom from "1 of 6" to "1 of 1".	Thanks, Made the change	7/17/2019 10:14:06	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	02376M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:15:07	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	02753M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:16:22	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	02755M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:17:02	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	02911M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:18:20	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	03390M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:21:34	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	03392M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:22:06	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	03605M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:22:57	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	03924M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:23:42	Scott Andrus, Bin Shi, Tim Wozab
Rferrin@utah.gov	Ryan Ferrin	03934M	Change page numbers from "1 of 4" to "1 of 1".	Thanks, Made the change	7/17/2019 10:24:25	Scott Andrus, Bin Shi, Tim Wozab
shawnlambert@utah.gov	Shawn Lambert	03924 - Section 1.5.C	What form of evidence are we looking for that the epoxy injectors have two years of experience? Is it feasible that our contractors will be able to provide personnel with this amount of experience?	This was in the original specification and was not changed in this scope. Merits review for future action. No action at this time.	7/19/2019 10:17:52	Scott Andrus, Bin Shi, Tim Wozab
shawnlambert@utah.gov	Shawn Lambert	01455, 01457, 01571M, 02376M, 02753, 03934M, 02755M, 02911M, 03390M, 03392M, 03605M,	No comments		7/19/2019 10:24:59	
vliu@utah.gov	Vincent Liu	No comments	No comments		7/25/2019 11:03:58	

Supplemental Specification
2017 Standard Specification Book

SECTION 01455M

MATERIAL QUALITY ~~REQUIREMENTS~~ASSURANCE

Delete Section 01455 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials ~~Acceptance~~ Quality Assurance

B. ~~Aggregate source sites~~Buy America

1.2 RELATED SECTIONS~~-~~ Not Used

~~A. Section 02911: Wood Fiber Mulch~~

~~B. Section 02922: Seed, Turf Seed, and Turf Sod~~

1.3 REFERENCES

A. UDOT Materials Manual of Instruction

B. UDOT Minimum Sampling and Testing Requirements

C. Code of Federal Regulations (CFR)

1.4 DEFINITIONS ~~– Not Used~~

A. Authorized Products List (APL) – A listing of manufactured products that have been verified as meeting the requirements in the standard specifications.

1.5 SUBMITTALS

~~A. Copies of test reports for all aggregate sources for approval – Refer to this Section, Articles 1.8B and 1.9B.~~
~~1. Required tests are listed in the technical specifications.~~

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~~B. Materials site plan for approval for Department furnished aggregate sources. Refer to this Section, Article 1.8C.~~

~~C. Property owner releases before physical completion. Refer to this Section, Article 1.10.~~

~~D~~A. Permission agreements for storing materials on private property~~, if requested.~~

~~E. Certifications of Compliance for information. Refer to this Section, Article 1.14C~~B Certifications of Compliance for all steel and iron products used on federal-aid projects demonstrating compliance with Buy America requirements for approval before delivery to project site.

1. Refer to this Section, Article 1.11 for Buy America requirements.
2. Include at least the following for domestic steel and iron products:
   a. Signed mill test report.
   b. Signed certification by each Fabricator and Manufacturer that has handled the steel or iron product affirming that every process, including the application of a coating, performed on the steel or iron product has been carried out in the United States.
   c. Material descriptions, quantities, and means of material identification such as heat numbers, lot numbers, and other industry identification markings for each process the material underwent so the final product can be tracked through a step process from smelting to final product.

~~d~~3. Tracking quantities is not required for coating operations and for mill certifications.

~~F. Cost documentation for use of foreign steel or iron for approval. Refer to this Section, Article 1.14D.~~

C. Cost documentation for use of foreign steel or iron on federal-aid projects for approval before payment and incorporation into the project, when applicable.

1. Include at least the following:
   a. Documentation that tracks the use of permanent foreign steel incorporated into the project.
   b. Material invoices documenting the material cost to the Contractor from the supplier as delivered to the site, not the Contractor's bid price.
   c. Total cost and percent of total contract amount showing that the cost of the foreign steel and iron does not exceed Buy America requirements

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1.6 MATERIALS ~~ACCEPTANCE~~ QUALITY ASSURANCE

~~A. Acceptance of the work is based on a combination of inspection, sampling and testing, and manufacturer information.~~

~~1. Acceptance of a material does not occur until all requirements have been met and verified.~~

~~B. Sampling and Testing~~

~~1. The Department verifies certain properties of work for acceptance using sampling and testing.~~

~~2. Only those properties determined by a certain test are considered accepted by that test.~~

~~C~~ A. Prequalification of Suppliers ~~Quality Management Plans~~

1. The Department pre-qualifies suppliers to provide products and materials according to ~~using~~ the requirements in Quality Management Plans (QMP). ~~A list of pre-qualified suppliers is maintained by the Department. Products delivered by suppliers who are not qualified or who lose qualification during the project, will be rejected.~~

   a. Use a pre-qualified supplier according to the QMP listed for the following materials:

      1) Cement – QMP 502
      2) Reinforcing Steel Epoxy – QMP 503
      3) Reinforcing Steel – QMP 504
      4) Precast / Prestressed Concrete Structures – QMP 505
      5) Ready Mix Concrete – QMP 506
      6) Flyash and Pozzolan – QMP 507
      7) Asphalt Emulsion – QMP 508
      8) Asphalt Binder – QMP 509
      9) Hydrated Lime – QMP 510
      10) Reinforcing Steel Galvanized Coating – QMP 512
      11) Pavement Marking Paint – QMP 513
      12) Hot Mix Asphalt – QMP 514

   b. A list of pre-qualified suppliers is maintained by the Department.

   c. Products delivered by suppliers who are not qualified or who lose qualification during the project will be rejected.

~~D. Manufacturer Information~~

B. Authorization of Materials Before Use Based on Manufacturer Information.

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1. The contract designates manufactured materials that can be incorporated in the work when authorized before use based upon manufacturer information.
   a. The manufacturer information required for authorization is specified in the technical specifications as submittals.
   b. APL Compliance Form
      1). Manufactured materials can be incorporated in the work only if listed on the APL when the APL Compliance Form is listed as a submittal in the technical specifications. The APL Compliance Form and application to submit products for placement on the APL can be found on the UDOT website.
      2). Materials not listed on the APL when the technical specifications list the APL Compliance Form as a submittal will not be authorized for use.

~~1~~c. Certificates of Compliance
   ~~a~~1). ~~The contract designates manufactured~~ Manufactured materials and assemblies can be incorporated in the work if accompanied by a manufacturer's Certificate of Compliance when a Certificate of Compliance is listed as a submittal in the technical specifications. ~~i~~Includes the following:
      ~~a~~1) Project number and description, location, and Contractors' name;
      ~~2)~~b Manufacturer's name, along with the material source location and point of manufacture or assembly;
      ~~3)~~c. Identification of the party the material was sold or supplied to;
      ~~4)~~d. Lot identification or manufacturer's identification of the certified materials or assemblies delivered to the project;
      ~~5)~~e. Reference to the technical section or requirement of the contract specifications fulfilled through certification along with test reports, when applicable; and
      ~~6)~~f. Statement that the materials or assemblies comply with the particular requirements of the contract cited above and signed by a manufacturer's representative in a position to legally bind the manufacturer.
   b. ~~Items of work subject to Buy America require additional documentation. Refer to this Section, Article 1.14.~~

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~~c~~2). The Department may sample and test materials or assemblies used on the basis of Certificates of Compliance and reject if determined not to meet contract requirements.

~~2~~d. Manufacturer's product data sheets and installation instructions

~~a~~1). ~~The contract defines m~~Materials ~~that~~ may be incorporated into the project based on information provided through manufacturer's product data sheets and installation instructions when listed as a submittal in the technical specifications.

.

~~b~~2). Provide sufficient information to demonstrate conformance with product requirements before incorporating the product into the work.

~~c~~3). Installation instructions supplement Part 3 Execution requirements of technical Sections; in case of conflict, the more stringent requirements apply.

~~d~~4). ~~The Approved Products List (~~APL~~)~~ Compliance Form may be submitted in lieu of product data sheets and installation instructions if the product is listed in the Department's APL~~, except when product requirements have been modified by special provision~~.

~~3. Other~~

~~a. Materials and products of work where method for verification for acceptance is not defined in the technical specification may be verified for conformance by any of the methods listed in this article, as determined by the Engineer.~~

C. Verification

1. Inspection

a. The Department field verifies material properties and their incorporation into the project as required in the technical specifications.

2. Sampling and Testing

a. The Department verifies certain properties of work for acceptance using sampling and testing.

b. Only those properties determined by a certain test are considered accepted by that test.

~~E~~c. The UDOT Minimum Sampling and Testing Requirements and the UDOT Materials Manual of Instruction define procedures for anyone performing tests for ~~acceptance~~verification.

~~F~~d. The Department does not allow contract time extension for or as a result of testing.

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~~G~~e. The Department may deduct from payment due the costs for retesting of materials made necessary by the Contractor's activities.

~~H~~f. Laboratories and technicians must be qualified according to the requirements of the UDOT Materials Manual of Instruction to perform materials sampling and testing.

D. Other

1. Materials and products of work where method for authorization or verification is not defined in the technical specification may be verified for conformance by any of the methods listed in this Article as determined by the Engineer.

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1.7 SUPPLY SOURCE AND QUALITY REQUIREMENTS

A. Notify the Engineer of the proposed source of materials to be used before their delivery.

B. The Department encourages the re-use of industrial byproducts that meet contract requirements.
   1. Use new materials for the work in cases where industrial byproducts do not meet contract requirements.

C. Required testing for aggregate sources will be deemed invalid unless testing occurred within a year of submittal.

~~1.8 DEPARTMENT FURNISHED AGGREGATE SOURCES~~

~~A. Possible sources of local optional materials may be available.~~
   ~~1. Expect variations in quantity and quality.~~
   ~~2. Material may be rejected if it is unacceptable or does not meet contract requirements.~~

~~B. Obtain authorization to use source material based on quality tests using a Department qualified laboratory.~~

~~C. Prepare and obtain approval of materials site plans that show in detail the line and grades of material removal.~~

~~D. Strip and stockpile topsoil before removing any materials.~~

~~1.9 CONTRACTOR FURNISHED AGGREGATE SOURCES~~

A. Acquire the rights to remove materials and enter into agreement with owner that specifies requirements for grading and reclamation after removing materials.

B. Perform required quality tests using a laboratory qualified by the Department.
   1. The Engineer may require additional samples for inspection and testing before authorizing use of the material.

C. Meet the requirements established by Utah Division of Oil, Gas, and Mining and other agencies having jurisdiction over the operation of commercial material source sites.

D. Strip and stockpile topsoil before removing any materials.

1.10 FINISHING AGGREGATE SOURCE SITES

A. Finish all public and private material source sites to the satisfaction of the Engineer.

B. Grade to drain without causing excessive erosion and without altering the natural drainage courses.

C. Locate aggregate waste sites in areas that are least visible from public view.
   1. Spread aggregate waste material to obtain a natural appearance.

D. Remove trash.
   1. Remove, bury, or distribute excess materials over the disturbed areas when excavation has been completed.

E. Perform required grading and reclamation, as required under the agreement with the property owner, when removal of material is complete and before spreading topsoil.
   1. Avoid vertical cuts and sharp corners.
   2. Grade side slopes to achieve a natural appearance.
   3. Abandon and obliterate haul roads.
   4. Obtain release from property owner indicating that all conditions of the agreement between the Contractor and property owner are satisfied.

F. Spread topsoil over the excavated area disturbed by construction operations including obliterated haul roads and seed all areas with grass or grasses adaptable to the area.
   1. Obtain required seed mix from Engineer.
   2. Seed and mulch according to Sections 02922 and 02911.

1.~~11~~8 PLANT INSPECTION

A. The Department may inspect and test materials at the acquisition, manufacturing, or supplying source for compliance with specified manufacturing methods.

B. Cooperate fully and assist the Engineer during the inspection and testing.
   1. Allow the Engineer full access to all parts of the plant used to manufacture or produce materials.
   2. Provide and maintain adequate safety measures.
   3. Provide mechanisms for providing samples during inspections.
      a. Equip crushing or screening facilities with automatic or semiautomatic mechanical sampling devices.

1.~~12~~9 MATERIAL STORAGE AND HANDLING

A. Store and handle materials according to manufacturer requirements.

B. Transport bulk materials in a manner to prevent loss or segregation after loading and measuring.

C. Store materials so they can be easily inspected and tested.

~~D. Furnish copies of the permission agreements to store materials on private property to the Engineer if requested.~~

~~E~~D. Restore storage and plant sites to their original condition.

E~~F~~. Do not store materials and equipment on bridge decks and in areas that add loads to bridge elements.

1.~~13~~10 DEPARTMENT FURNISHED MATERIALS

A. Schedule, pickup, and deliver Department furnished materials to install at the specified site.
   1. Receive, inventory, store, protect, distribute and install at site as specified.

B. Contractor is responsible for all materials received. The Department deducts from ~~any~~ money due ~~to~~ the ~~c~~Contractor for ~~any of~~ the following:
   1. ~~Any s~~Shortages, deficiencies, and damage that may occur to the material after physical transference from the Department.
   2. The demurrage charges resulting from failure to accept the material at the designated time and point of delivery.

C. The terms Department furnished, State furnished, and owner furnished are used interchangeably throughout the contract documents to mean components for specific use in the project that are provided by an entity other than the Contractor.

1.~~14~~11 BUY AMERICA

A. Federal-aid projects are subject to Title 23 CFR Part 635.410, Buy America ~~R~~requirements.

~~1. Check the appropriate box on the bid proposal indicating the intent to use steel or iron or both of 100 percent domestic supply or with some foreign supply.~~

~~2. The Department considers the bid a bid for furnishing domestic steel and iron if neither box is checked.~~

~~3. The Department awards the Contract to the bidder who submits the lowest total contract bid based on furnishing domestic steel and iron unless the total contract bid exceeds the lowest total contract bid based on foreign steel and iron by more than 25 percent.~~

~~B~~1. All products manufactured from steel and iron must be manufactured in the United States to be considered domestic.

~~1~~a. All manufacturing processes of the steel and iron material in a product such as melting, rolling, extruding, machining, bending, grinding, drilling, and coating must occur within the United States.

~~2~~b. Coating includes all processes that protect or enhance the value of the material to which the coating is applied. The material applied as a coating is not subject to Buy America requirements.

~~C. Submit Certifications of Compliance of materials before delivery to site.~~

~~1. Include as a minimum the following information for Certifications of Compliance for Buy America:~~

~~a. Signed mill test report.~~

~~b. Signed certification by each Fabricator and Manufacturer that has handled the steel or iron product affirming that every process, including the application of a coating, performed on the steel or iron product has been carried out in the United States.~~

~~c. Material descriptions, quantities, and means of material identification such as heat numbers, lot numbers, and other industry identification markings for each process the material underwent so the final product can be tracked through a step process from smelting to final product.~~

~~d. Tracking quantities is not required for coating operations and for mill certifications.~~

~~2. Include all steel or iron materials that can't be substantiated as being of domestic origin in cost documentation for foreign steel or iron.~~

~~D~~2. The above requirement does not preclude a minimal use of foreign steel or iron, provided the cost of the steel or iron used does not exceed one tenth of one percent (0.1 percent) of the total contract amount or $2,500, whichever is greater.

~~1~~a. Track the use of all permanent foreign steel incorporated in the project.

~~2. Provide satisfactory cost documentation to the Engineer before payment and incorporation of the materials into the project when foreign steel or iron is used as allowed by this article.~~

~~a. Cost documentation is the material invoices documenting the material cost to the Contractor from the supplier as delivered to the site, not the Contractor's bid price.~~

~~E~~3. The following are exempt from Buy America except as noted:

~~1~~a. Temporary steel or iron materials.

~~2~~b. Materials left in place for the Contractor's convenience that could be removed without damaging the completed work

~~3~~c. Items such as nuts, bolts, washers, screws, concrete chairs, spacers, mailboxes, and other steel or iron parts that may be considered miniscule or non-structural to the whole of the project.

~~4~~d. Fencing stays, clips, staples, or other miscellaneous fencing components.

~~5~~e. Manufactured assemblies that are less than 51 percent by weight steel or iron content when ~~it is~~they are delivered to the job site for installation.

~~a~~1) Precast items such as pipe, manhole, and drainage boxes must meet the Buy America requirements.

~~6~~f. The major steel and iron components of the following and other similar assemblies must meet the ~~requirements of~~ Buy America requirements:

~~a~~1) Guardrail, guardrail posts, end sections, terminals, cable barrier, steel or iron pipe, conduit, grates, manhole covers and risers, mast arms, poles, standards, trusses, supporting structural members for signs, luminaires, and traffic control systems.

1.~~15~~12 CONVICT PRODUCED MATERIALS

A. Federal-aid projects are subject to Title 23, Code of Federal Regulations, CFR Part 635.417, Convict Produced Materials.

~~B~~1. Materials produced after July 1, 1991, by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:

~~1~~a. Produced by convicts who are on parole, supervised release, or probation from a prison.

~~2~~b. Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facilities for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

Supplemental Specification
2017 Standard Specification Book

SECTION 01457

AGGREGATE SOURCE CONTROL

Add Section 01457

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate source sites.

1.2 RELATED SECTIONS

A. Section 02911: Hydraulic Erosion Control Products

B. Section 02922: Seed, Turf Seed, and Turf Sod

1.3 REFERENCES Not Used

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Copies of test reports for all aggregate sources for approval.
   1. Required tests are listed in the technical specifications.

B. Materials site plan for Department furnished aggregate sources for approval.
   1. Show in detail the line and grades of material removal.

C. Property owner releases before physical completion.
   1. Include a statement that all conditions of the agreement between the Contractor and property owner are satisfied.
   2. Provide completed UDOT Form C-200.

1.6 AGGREGATE SUPPLY SOURCE AND QUALITY REQUIREMENTS

A. Notify the Engineer and obtain approval of the proposed source of materials to be used before delivery of materials.

1.7 DEPARTMENT FURNISHED AGGREGATE SOURCES

A. Possible sources of local optional materials may be available.
   1. Expect variations in quantity and quality.
   2. ~~Material may be rejected if it is unacceptable or does not meet contract requirements.~~

B. Obtain approval to use source material based on quality tests using a Department qualified laboratory.

C. Strip and stockpile topsoil before removing any materials.

1.8 CONTRACTOR FURNISHED AGGREGATE SOURCES

A. Acquire the rights to remove materials and enter into agreement with owner that specifies requirements for grading and reclamation after removing materials.

B. Perform required quality tests using a laboratory qualified by the Department.
   1. The Engineer may require additional samples for inspection and testing before approving use of the material.

C. Meet the requirements established by Utah Division of Oil, Gas, and Mining and other agencies having jurisdiction over the operation of commercial material source sites.

D. Strip and stockpile topsoil before removing any materials.

1.9 FINISHING AGGREGATE SOURCE SITES

A. Finish all public and private material source sites to the satisfaction of the Engineer.

B. Grade to drain without causing excessive erosion and without altering the natural drainage courses.

C. Locate aggregate waste sites in areas that are least visible from public view.
   1. Spread aggregate waste material to obtain a natural appearance.

D. Remove trash.
   1. Remove, bury, or distribute excess materials over the disturbed areas when excavation has been completed.

E. Perform required grading and reclamation as required under the agreement with the property owner when removal of material is complete and before spreading topsoil.
   1. Avoid vertical cuts and sharp corners.
   2. Grade side slopes to achieve a natural appearance.
   3. Abandon and obliterate haul roads.
   4. Obtain release from property owner indicating that all conditions of the agreement between the Contractor and property owner are satisfied.

F. Spread topsoil over the excavated area disturbed by construction operations including obliterated haul roads and seed all areas ~~with grass or grasses adaptable to the area~~.
   1. Obtain required seed mix from Engineer.
   2. Seed and mulch according to Sections 02922 and 02911.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

Supplemental Specification
2017 Standard Specification Book

SECTION 02753M

FULL DEPTH SLAB REPLACEMENT FOR CONCRETE PAVEMENTS

Delete 1.5 A and replace with the following:

~~**1.5 SUBMITTALS**~~

~~A. Manufacturer's product data sheets and recommended installation instructions~~

A. ~~Approved~~uthorized Products List (APL) Compliance Form for Epoxy Resin Adhesive.

Supplemental Specification
2017 Standard Specification Book

SECTION 02755M

CONCRETE SLAB JACKING

Delete 1.5 B and replace with the following:

~~**1.5 SUBMITTALS**~~

~~B. Manufacturer's product data sheet and recommended installation instructions.~~

B. ~~Approved~~uthorized Products List (APL) Compliance Form.

Standards Committee Submittal Sheet

Name of Preparer: Michael A. Adams

Title/Position of Preparer: ITS Standards Engineer

Specification/Drawing/Item Title: AXIS CCTV Mounting Detail and Wiring Diagram, CCTV Mounting and Wiring Diagram, CCTV Pole Mounting Details, Non-Intrusive Detector Mounting Details, Closed Circuit Television Assembly

Specification/Drawing Number: New AT10A, New AT10B, AT 11A, AT 11B, 13556M, additionally - Delete AT 10C, AT 10D, AT 10E,

Priority Level (see last page for explanation) 3

Completion of paragraphs A, F, and G are mandatory. Lack of information or insufficient information will result in rejection of agenda item.

NOTES:

1. All Submittal Sheets must be completed and sent to the Standards Section by meeting the applicable Coordination due date. (See https://www.udot.utah.gov/StandardsCommitteeScheduleDates)
2. The Preparer of the Submittal Sheet or the Standards Committee member (or authorized substitute) responsible for the submittal must be present at the Standards Committee or Modified Process meeting and capable of discussing and answering all questions related to the submittal. The item will be postponed to a later meeting if one of these people is not present.
3. Notify the Standards Section immediately of any changes that impact the presentation to include absence of sponsor or delay in presentation.

Complete the following: (Use additional pages as needed.)

A. Why? Detail the reason for changing the Standard (Specification or Drawing), what has initiated a new Standard or what has caused a new or changed item of interest. **(MANDATORY)**

The ATMS Traffic Surveillance System "analog" cameras are swiftly becoming obsolete to the surveillance camera industry and require updating. The "AXIS" IP CCTV is an Internet Protocol (IP) based system that will replace the Pelco Espirit and Vicon Dome CCTVs. As a result, the TMD is introducing (2) new Standard Drawings AT 10A, AT 10B and revising AT 11A to show the new AXIS IP CCTV Camera and the wiring diagram to support the installation. The TMD is deleting Standard Drawings AT10C, AT10D and AT10E because they depict our older, obsolete CCTV systems.

13556M is needed to supplement the change from the "analog" CCTV cameras to the new AXIS IP CCTV camera.

AT 11B is being revised to accommodate the changes required by newer versions of the Non-Intrusive Detectors themselves.

B. Measurement, Payment, Acceptance, and Documentation:

1. How is Measurement and Payment handled? Existing (from the measurement and payment document), modified, or new measurement and payment to be included with all Standard Specifications or Supplemental Specifications. **No Change**

2. How is Acceptance and Documentation handled? Existing (from the acceptance and documentation document), modified, or new acceptance and documentation to be included with all Standard Specifications or Supplemental Specifications. Include Contractor Submittals, Inspection Elements, and Documentation. **No Change**

C. Stakeholder Notification for AGC and ACEC:

Provide by e-mail, the AGC and ACEC Standards Committee member a copy of all pertinent information relating to the specification or drawing. Detail all responses on the Standards Committee Review Comments Form.

Note: There is a two-week response time set for this item.

Refer to the Standards Committee Web site, http://www.udot.utah.gov/go/standardscommittee to "Standards Committee Members" for the respective e-mail addresses.

AGC: (Document comments on the Comment Form)

ACEC: (Document comments on the Comment Form)

D. Stakeholders:
Document the stakeholders contacted on the Standards Committee Review Comments Form, detailing: the company, name of contact, how contacted (by phone, email, hard copy, or in person), concerns, and comments of the change.
Stakeholders:

Note: There is a two-week response time set for this item to allow Stakeholders time to process and respond to coordination requests. All areas should try to complete review and comment as soon as possible but within two weeks. Advise Stakeholder if less time is given the Stakeholder to complete this requirement.

Contact all applicable UDOT personnel, FHWA representative for the type item being reviewed, contractors and consultants contacted in addition to those

contacted in paragraph “C” above, suppliers, manufacturers and any others as deemed appropriate. Include all those contacted on the Standards Committee Review Comments Form.

FHWA (Accomplished as part of the two-week process before submitting to the Standards section for inclusion on the Standards Committee agenda.) This is in addition to the requirements of UDOT Policy 08A5-01, procedure 08A5-01.3.

E. Other impacted areas, systems, or personnel. Consider all impacts and possible changes to these areas during the preparation process. Coordinate with all appropriate areas for the respective item. List all impacts and action taken.

1. Minimum Sampling and Testing Requirements **Not Applicable**

2. Business Systems (Electronic Bid System, Project Development Business System, Electronic Program Management, Computer-Aided Drafting and Design, etc.) **No Change**

3. Implementation Plan (Provide detailed instructions on how the subject item will be implemented to include notification of all interested parties and training requirements.) **E-mail notice will be sent as part of the Standards Section’s publishing process.**

4. What additional systems and documents need modification to reflect this change? **None**

F. Costs? (Estimates are acceptable.) **(MANDATORY)**

1. Cost Impact to the Department (For example, unit bid price, change in quantity, total scope impacts in year, increase in contractor’s overhead or mobilization). **Not Applicable**

2. Operational (For example, maintenance, materials, equipment, labor, administrative, programming). **No Change**

3. Life cycle cost. **Not Applicable**

G. Benefits? Provide details that can be used to complete a Cost – Benefit Analysis. Estimates are acceptable. What is the benefit of making this change if no cost is involved? **(MANDATORY)**
The Traffic Surveillance industry is phasing out the manufacture of analog video cameras in favor of the IP based systems. The Traffic Management Division needs to follow this change in order to stay current with the CCTV camera manufacturers.

H. Safety Impacts? **No Change**

I. History? Address issues relating to the current usage of the item and past reviews, approvals, and/or disapprovals.

The Traffic Management Division has been working with various different methods to bring H.264 video streams into the TOC that will work with the antiquated video wall and video command system. The current traffic surveillance video system works with MPEG2 and MPEG4 video streams. The video signal from the CCTVs are converted from analog signals to digital signals via "encoders" at the CCTV location and brought back to the TOC in IP format. Next, the signals are decoded to feed the projector based video wall for observation.
The entire video system including the projector based video wall is also becoming obsolete and needs to be replaced.
The TMD budget was unable to accommodate that so, we brought in various manufacturers "multi-format" video decoders in order to decode MPEG2, MPEG4, and H.264 video streams. We did not find an "off the shelf" product that could succeed with this option.
Finally we committed to purchasing an IP CCTV that would work in both a lowering arm system and top of pole mount. Then, we set about to "make it work". This "make it work" method has taken about seven months of trial and error and we have finally found a solution (software and hardware) that will send a video stream to the TOC that we can decode and display on the video wall. The TOC has determined that we can "get by" with this solution until our entire video system can be replaced. Once we purchase the replacement video wall and video command system, we will have HD Traffic Surveillance video.

Timestamp	Email Address	REVIEWER	DRAWING #, SECTION #, ARTICLE #, ETC.	COMMENT	RESPONSE	RESPONSE BY
7/17/2019 10:55:16	kthornock@utah.gov	Kirk Thornock	ATMS Spec and Drawings	No Comments		
7/17/2019 14:11:36	Rferrin@utah.gov	Ryan Ferrin	13556M	Correct page number at bottom to read "3 of 3" instead of "3 of 2".	OK, we will correct the numbering	Michael A. Adams
7/17/2019 14:27:52	Rferrin@utah.gov	Ryan Ferrin	AT Drawings	No comments		
7/17/2019 16:42:07	dfriant@utah.gov	Daryl Friant	ATMS Specs and Drawings	No comments		
7/18/2019 14:07:25	dpage@utah.gov	Danny Page	13556M, AT Drawings	No comments		
7/18/2019 14:33:44	jtremaine@utah.gov	Janice	ATMS Specs & Drawings	No Comment		
7/19/2019 10:57:55	shawnlambert@utah.gov	Shawn Lambert	ATMS Specs and Drawings	No Comments		
7/19/2019 14:24:57	michaeladams@utah.gov	Michael A. Adams	13556M	Delete Article 2.1, Paragraph E. Cat 6 Shielded Cable. Create Article 2.7 Non Armored Cat 6 Shielded Cable and Connectors, Create Paragraphs A and B to describe Contractor furnished Cat 6 Shielded Cable and Connectors	Change during coordination by TMD Electrical Staff	Michael A. Adams
7/19/2019 17:23:53	michaeladams@utah.gov	Michael A. Adams	AT10B	Add RJ 45 Shielded Connector to Cat 6 Shielded Cable at top of pole. Change Detail C to Schematic, Add Detail D to Show EIA/TIA 568B Standards	Change during coordination by TMD Electrical Staff	Michael A. Adams
7/19/2019 17:30:55	michaeladams@utah.gov	Michael A. Adams	13556M	Article 1.1 Delete References to Positioner and Dome Cameras (change to AXIS), Article 2.4 Delete Paragraph E, Add Article 2.7, Moves Cat 6 Cable from State Furnished to Contractor Furnished, Delete Article 3.2 Paragraph C, Revise Article 3.7 Paragraph A(3), Paragraphs D and E	Change during coordination by ITS Standards Engineer	Michael A. Adams
7/22/2019 11:38:06	michaeladams@utah.gov	Michael A. Adams (Kent Thurston)	AT11A	Please add 30 ft max. height for NIDs to Detail B to match AT11B	We will add to Note 5 to require 30 ft mounting height and make references to See Note 5	Michael A. Adams
7/25/2019 13:18:43	vliu@utah.gov	Vincent Liu	No comments	No comments		
7/29/2019 14:39:21	jcorney@utah.gov	James Corney	3.7 & 3.7 D	Reword "composite" to "data" "CCTV DATA CABLE"	We used CCTV Cable	Michael A. Adams
7/29/2019 14:39:41	jcorney@utah.gov	James Corney	2.1 A1 & A2	AT 11A shows 45/60/75 ft for the lowering poles and only 45ft for the non-lowering. This matches the previous version of the spec.	I corrected this error after James directed me to it. The Non Lowering Poles are 45 ft and 60 ft and Lowering Poles are 45 ft, 60 ft, and 75 ft	Michael A. Adams
7/29/2019 14:41:09	jcorney@utah.gov	James Corney	2.1 A2	Should the anchor bolts be mentioned with each of the pole types?	It may help the contractor know that the State furnishes them	Michael A. Adams
7/29/2019 14:41:33	jcorney@utah.gov	James Corney	AT drawings	Consider deleting the detail letter names (in the circles). The AT drawings are the only standards that use this style.	This may not be possible unless I change the entire set of AT Series Std Dwgs at one time and run it through the Committee, therefore, we will visit this some other time.	Michael A. Adams

7/29/2019 14:41:50	jcorney@utah.gov	James Corney	AT 11A: Note 14	Is there a difference between a 336S cabinet and a 336 cabinet?	I deleted the "S" in 336S after James pointed the issue to me. 336 Cabinets are rated at 3R. Due to deleting the NEMA 3S Cabinet for the 336, the 4'x3'x4" concrete pad is not needed - Delete Note 15	Michael A. Adams
7/30/2019 6:48:45	russell.robertson@dot.gov	FHWA	ATMS	No comments.		
7/30/2019 11:52:54	kbarrett@utah.gov	Kelly Barrett	NA	Nothing of concern		
7/30/2019 13:56:24	dlahusen@avenueconsultants.com	ACEC	ATMS CCTV	No Comment		
7/30/2019 18:23:28	betty@wadsco.com	AGC	All	No comments received from the AGC		
7/31/2019 7:20:53	fdoehring@utah.gov	Fred Doehring	all	No comments		
7/31/2019 11:33:53	brettslater@utah.gov	Brett Slater	13556M	No Comment		
8/1/2019 10:41:51	cmason-hill@utah.gov	Charles Mason-Hill	All	No Comment		

Supplemental Specification
2017 Standard Specification Book

SECTION 13556M

CLOSED CIRCUIT TELEVISION (CCTV) ASSEMBLY

Delete Article 1.1, Paragraph B and replace with the following:

B. Installation of State furnished non-lowering and camera lowering CCTV poles and AXIS CCTV assembly.

Delete Article 2.1 and replace with the following:

~~**2.1 STATE FURNISHED ITEMS**~~

~~A. CCTV Pole or luminaire pole~~
~~1. Non-lowering CCTV Pole –45 ft steel pole with anchor bolts.~~
~~2. Camera Lowering Pole –45 ft, 60 ft, or 75 ft steel pole with anchor bolts.~~
~~3 Luminaire Mounted CCTV – Luminaire vertical extension on signal pole.~~

~~B. CCTV Assembly~~
~~1. Positioner Camera assembly – includes camera, pan/tilt unit, control receiver, environmental enclosure, and manufacturer's operation manual and equipment list.~~
~~2. Dome Camera assembly – includes camera with integrated pan/tilt unit, control receiver, environmental enclosure, and manufacturer's operation manual and equipment list.~~
~~3. IPS-RDPE-2 – Remote Data Port Enclosure, 24 Volt Power Supply, IPS cable.~~
~~4. Refer to AT Series Standard Drawings to identify the required component parts, installation details, and wiring diagrams.~~

~~C. Camera Lowering System~~
~~1. Camera lowering assembly including suspension contact unit, pole adapter for attachment to a pole top tenon, pole top junction box, steel cable, pulleys, support arm, camera connection junction box, and portable camera lowering tool.~~

~~D. Data Surge Suppressor.~~

~~E. Video Surge Suppressor.~~

~~F. Composite CCTV cable~~

~~G. NEMA 3S Pole Mounted Cabinet or NEMA 3S-336S Pole Mounted Cabinet.~~

2.1 STATE FURNISHED EQUIPMENT

A. CCTV Pole or Luminaire Pole.
1. Non-Lowering CCTV pole - 45 ft or~~,~~ 60 ft~~, 75 ft~~ steel pole with anchor bolts
2. Camera Lowering Poles – 45 ft, 60 ft, or 75 ft steel pole with anchor bolts
3. Luminaire Mounted CCTV- luminaire vertical extensions on signal poles

B. CCTV Assembly
1. Positioner camera assembly- includes the integrated camera and pan tilt unit, base, P~~p~~ush~~/~~-pull RJ-45 connector kit and POE++ (Power supply and AC cord)
2. Pole mounted camera assembly - pole adapter plate AXIS T94N01G and wall mounted arm AXIS T94J01A
3. Top Pole Mount - Pelco EPP to AXIS Q6215-LE adapter bracket
4. Refer to AT Series Standard Drawings to identify the required component parts, installation details, and wiring diagrams.

C. Camera Lowering S~~s~~ystem
1. Camera lowering assembly including suspension contact unit, pole adapter for attachment to a pole top tenon, pole top junction box, steel cable, pulleys, support arm, camera connection junction box, portable camera lowering tool, and Pelco EPP to AXIS Q6215-LE adapter bracket.
2. Amphenol LTW RJ45 D size double screw connector (see AT Series Standard Drawings)

D. Data surge suppressor

~~E. Cat 6 shielded cable.~~

E~~F~~. Pole mounted 336 cabinet or~~,~~ ground mounted 334 cabinet

Delete Article 2.4, Paragraph E

Add Article 2.7.~~,~~

2.7 NON ARMORED CAT 6 SHIELDED CABLE AND CONNECTORS

A. Provide Non Armored Cat 6 Shielded Cable.
   1. Use Omni Cable J662304-05 23/4PR CMR Cat 6 Shielded Blue Riser, Superior Essex Part No. 04-001-64, Paige Datacom Solutions GameChanger Shielded OSP Cable Part No. 258340804 or approved equivalent.

B. Provide shielded RJ45 connectors for Cat 6 cable

Delete Article 3.2, Paragraph C and D and replace with the following:

~~C. Pressurize Dome CCTV camera in the field according to the Manufacturer's instructions.~~

~~D~~C. Clear equipment exterior of all loose rust and mill scale, dirt, oil, grease, and other foreign substances.

Delete Article 3.7~~, Paragraph A~~ and replace with the following:

~~A. Install CCTV composite cables in conduit and poles.~~
   ~~1. Run cables continuously and without splices between camera and cabinet.~~
   ~~2. Do not exceed 500 ft for length of composite cable.~~
   ~~3. Use cable connectors when and where exposed cables enter the pole.~~

A. Install CCTV cables in conduit and poles.
   1. Run cables continuously and without splices between camera and cabinet.
   2. Do not exceed 300 ft for length of Cat 6 cable unless approved by the Engineer.
   3. Use cable cord grip ~~connectors~~ when and where exposed cables enter the pole.

B. Keep cable ends sealed at all times during installation until connectors are installed using an approved cable end cap.

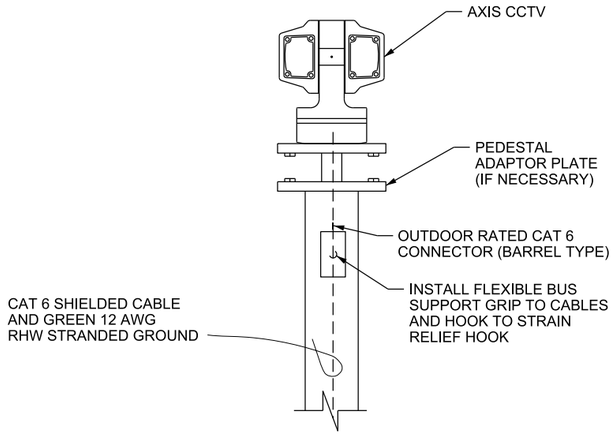
C. Install cable without violating the minimum bending radius and the maximum pulling tension recommended by the manufacturer's specifications at any time.

~~D. Provide 6 ft of CCTV composite cable slack placed in the junction box adjacent to the cabinet. Refer to Section 13555.~~

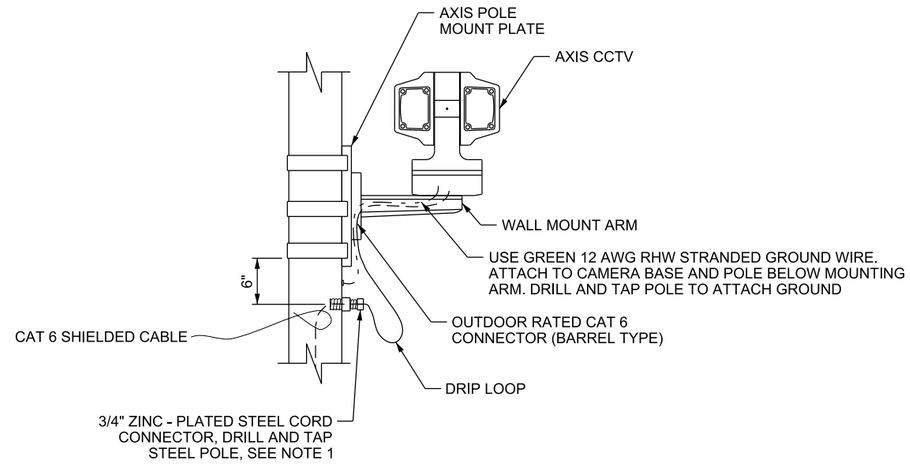
D. Provide 6 ft of CCTV cable slack placed in the junction box adjacent to the cabinet. Refer to Section 13555.

~~E. Make all camera cable connections between the CCTV camera, Remote Data Port Enclosure (RDPE), surge suppression device, and communications equipment, as required to provide a fully operational CCTV system.~~

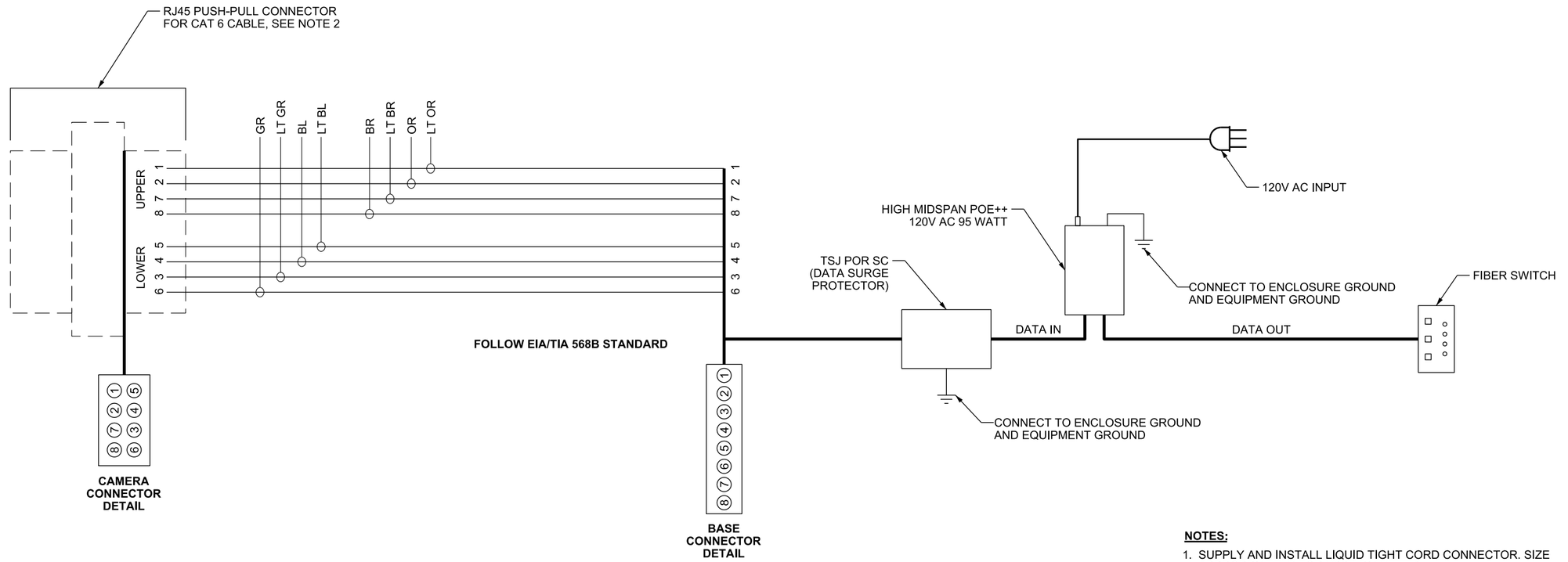
E. Make all camera cable connections between the CCTV camera, surge suppression device, and communications equipment, as required to provide a fully operational CCTV system.



A MOUNTING DETAIL PEDESTAL MOUNTED AXIS CCTV



B MOUNTING DETAIL POLE MOUNTED AXIS CCTV



C WIRING DIAGRAM AXIS CAMERA

NOTES:

1. SUPPLY AND INSTALL LIQUID TIGHT CORD CONNECTOR. SIZE APPROPRIATELY FOR WIRE DIAMETER.
2. USE VENDOR SUPPLIED RJ45 PUSH-PULL CONNECTOR FOR CAMERA TERMINATION.
3. TIE CABLE TO GROUND THROUGH CAT 6 SHIELDED CONNECTOR.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	8/29/19	MMA	REPLACED ENTIRE DRAWING WITH NEW CAMERA TYPE

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

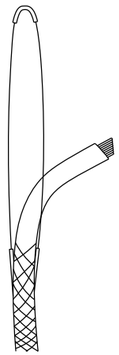
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

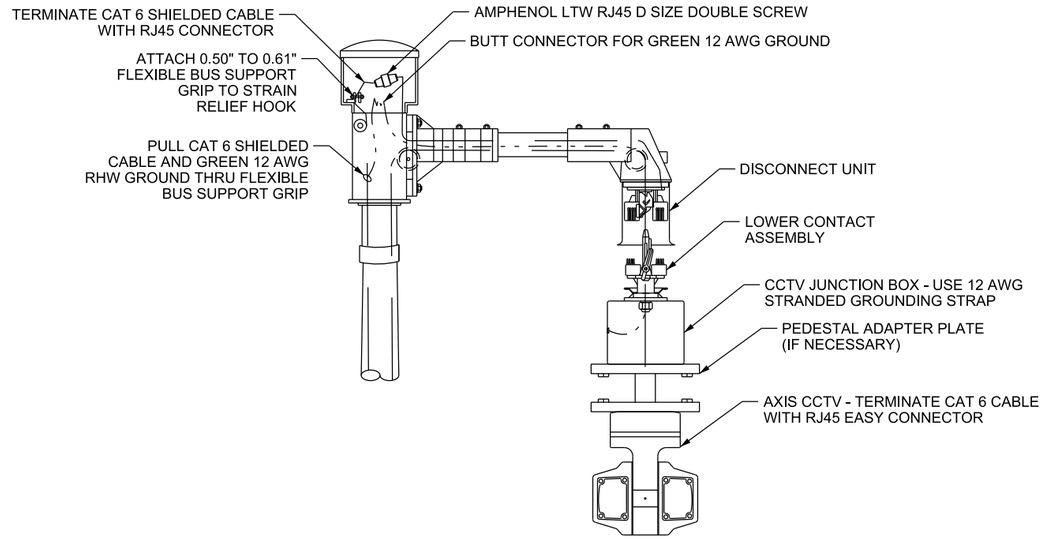
STANDARD DRAWING TITLE
AXIS CCTV
MOUNTING DETAIL
AND WIRING DIAGRAM

STD. DWG. NO.
AT 10A

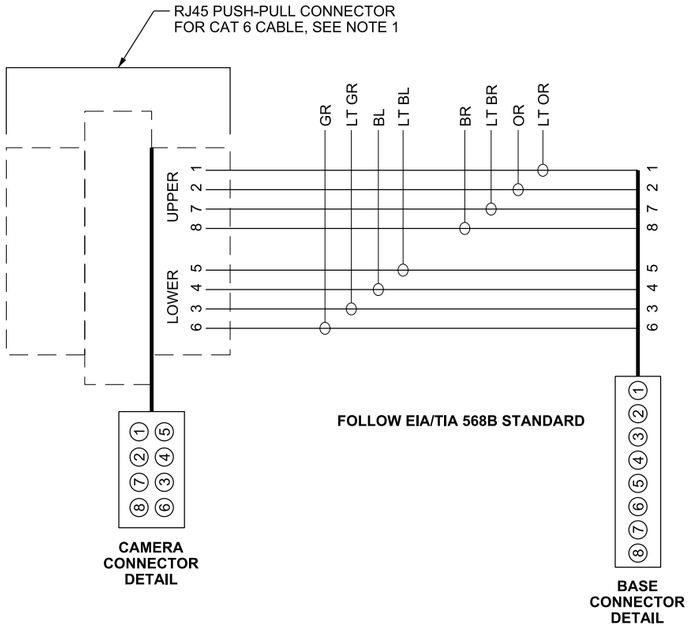
08-AUG-2019 DGN File: D:\Standardsand5pecsSection\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\ATMS- Mike Adams\3-AgendaVersion\AT10A.dgn



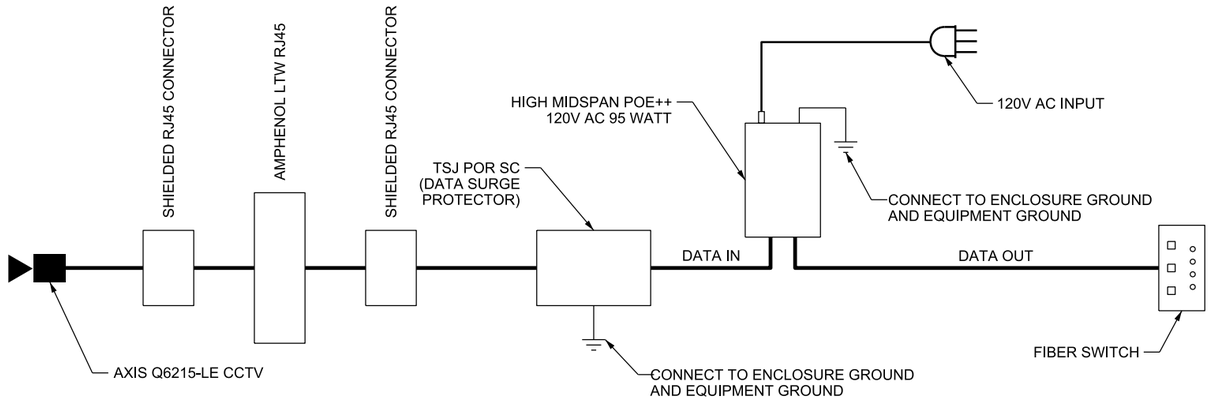
A DETAIL
FLEXIBLE BUS SUPPORT GRIP



B MOUNTING DETAIL
CAMERA LOWERING SYSTEM (AXIS)



C PIN DETAIL
RJ45 CONNECTORS



D WIRING DIAGRAM
AXIS CAMERA

NOTE:

1. USE VENDOR SUPPLIED RJ45 PUSH-PULL CONNECTOR FOR CAMERA TERMINATION.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	8/29/19	MMA	REPLACED ENTIRE DRAWING WITH NEW CAMERA TYPE

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

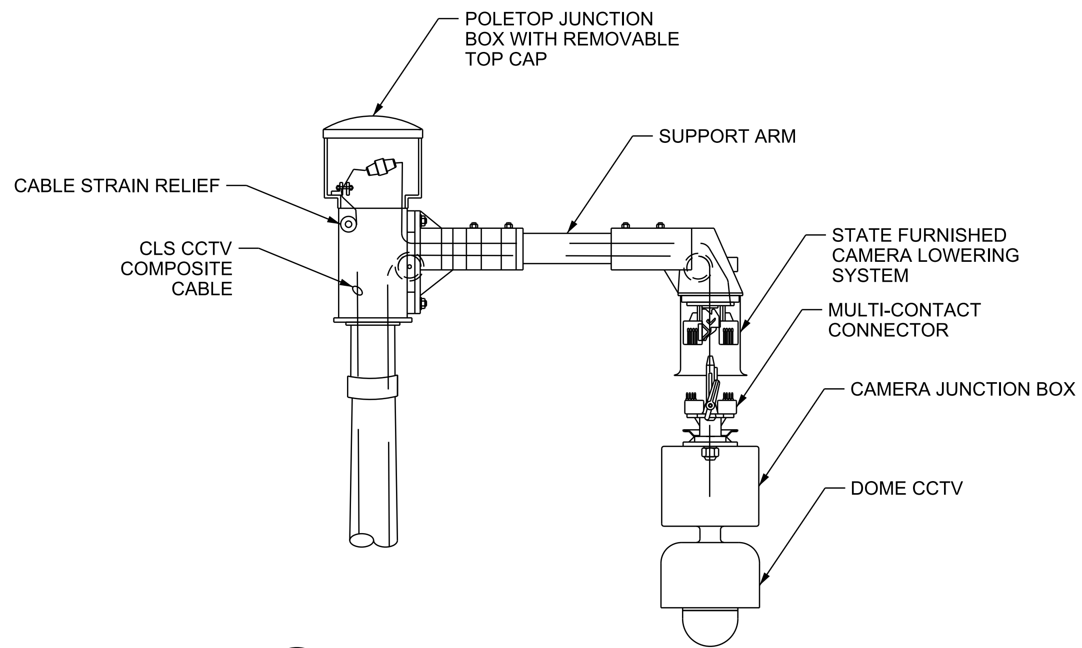
DEPUTY DIRECTOR

CCTV MOUNTING DETAIL AND WIRING DIAGRAM

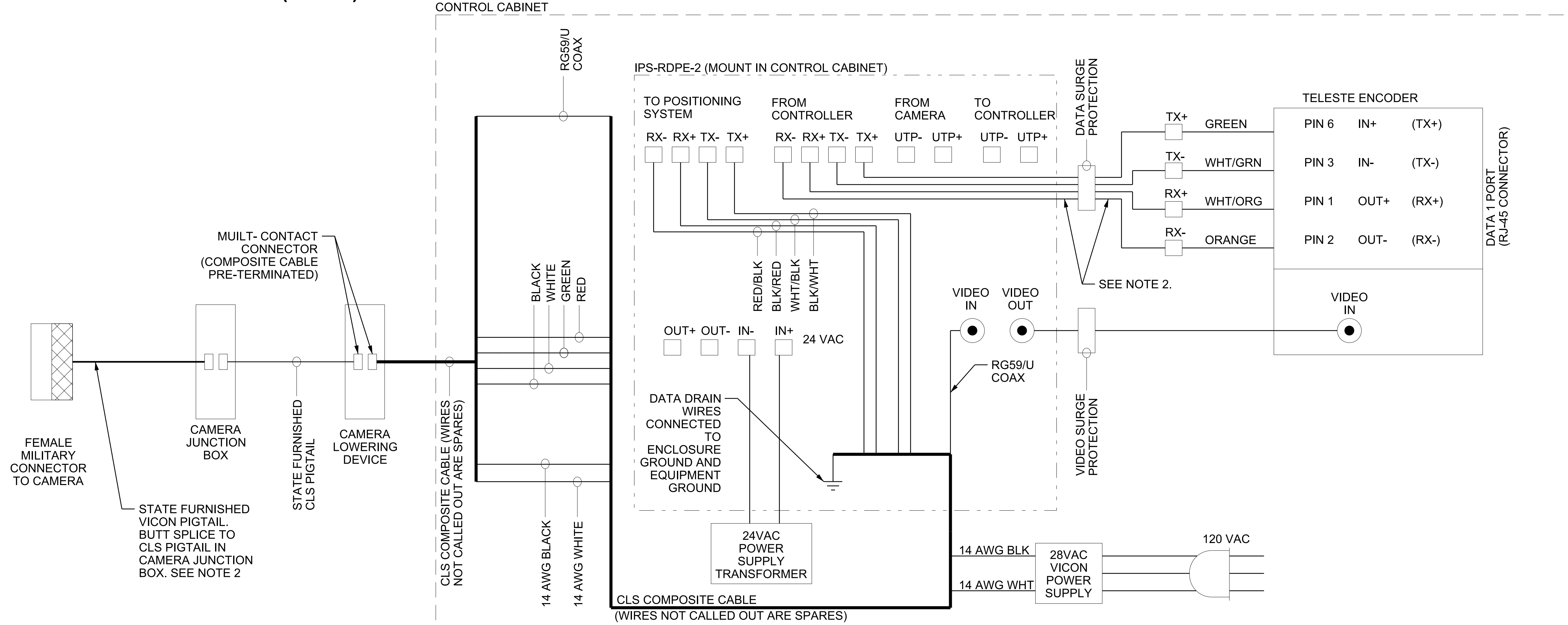
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 10B

08-AUG-2019 DGN File: D:\Standards and Specs Section\Standards Committee\Meeting Files\2019\5-August 29, 2019\Incoming\ATMS- Mike Adams\3-Agenda Version\AT10B.dgn



(A) MOUNTING DETAIL
CAMERA LOWERING SYSTEM
(VICON)



(B) WIRING DIAGRAM
DOME CAMERA
(VICON)

NOTES:

1. FURNISH AND INSTALL CAT 5 PATCH CABLE WITH RJ-45 CONNECTOR TO ENCODER AND BARE WIRES TO RDPE.

2. FURNISH & INSTALL BUTT SPLICE 3M SCOTCHLOCK MNG18BC OR MNG14BC OR APPROVED EQUAL. SIZE APPROPRIATELY FOR WIRE DIAMETER. USE BNC CONNECTOR FOR COAXIAL CABLE. SEE DETAIL B ON STD DWG AT 10D.

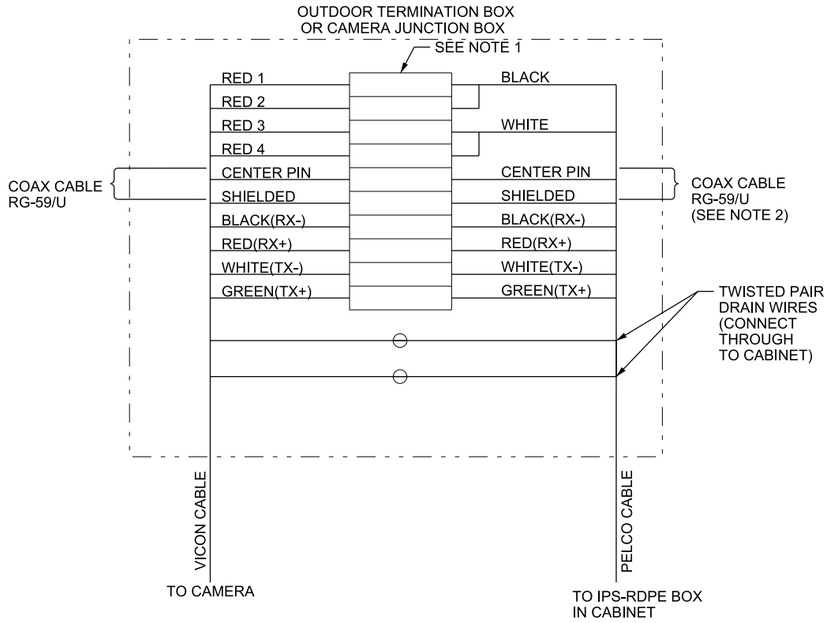
NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

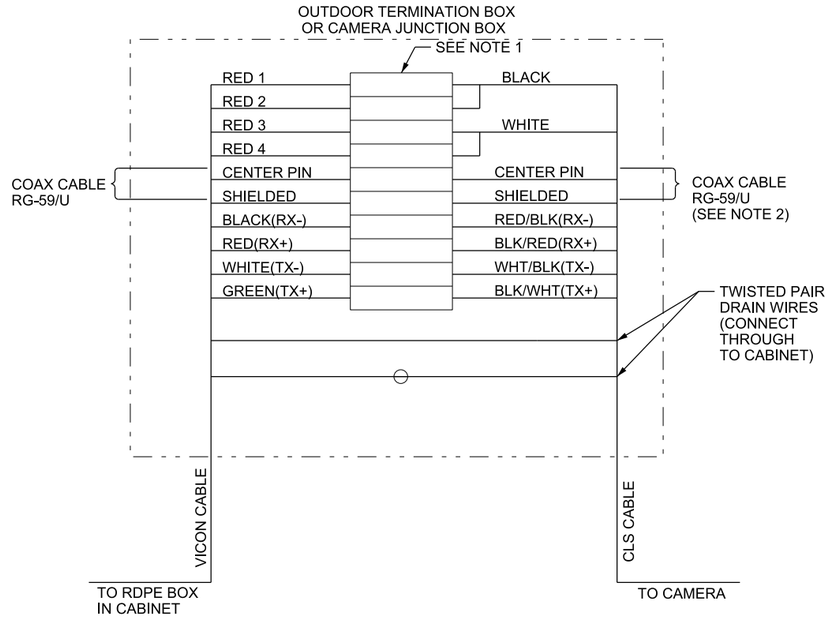
RECOMMENDED FOR APPROVAL — JAN. 10, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN. 10, 2017 DATE
DEPUTY DIRECTOR

CCTV MOUNTING DETAIL AND WIRING DIAGRAM
STANDARD DRAWING TITLE

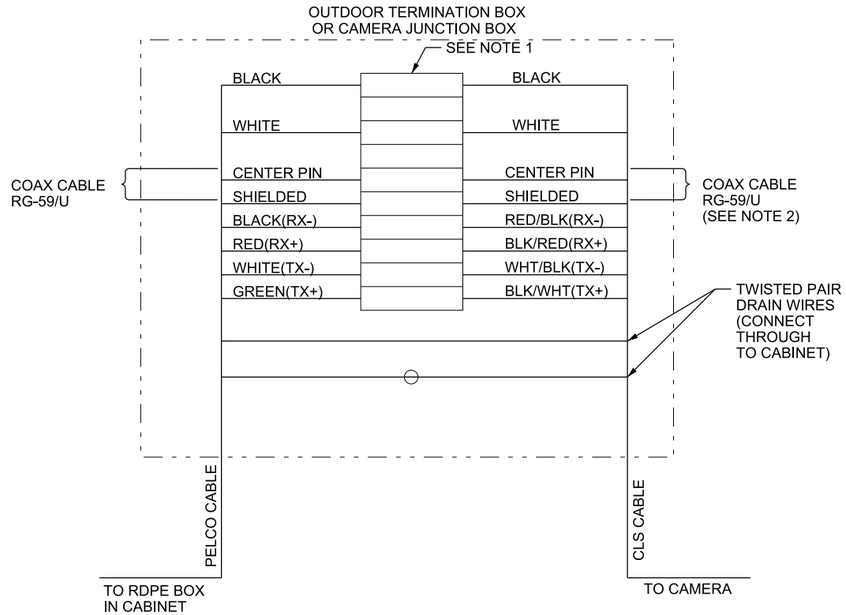
STD. DWG. NO.
AT 10C



A SPLICING DIAGRAM VICON INTO PELCO



B SPLICING DIAGRAM VICON INTO CLS



C SPLICING DIAGRAM PELCO INTO CLS

NOTES:

1. FURNISH AND INSTALL BUTT SPLICE 3M SCOTCHLOCK (MNG 18BC, MNG 14BC) OR APPROVED EQUAL. SIZE APPROPRIATELY FOR WIRE DIAMETER.
2. USE BNC CONNECTOR FOR RG-59 COAX CABLE.
3. WIRES NOT CALLED OUT ARE SPARES.
4. DETAIL "A" USED WHEN INSTALLING A NEW VICON DOME CAMERA AT AN EXISTING PELCO CAMERA LOCATION.
5. DETAIL "B" USED WHEN INSTALLING A NEW CAMERA ON A CLS POLE WHEN THE FACTORY PRE-TERMINATED CLS CABLE DOES NOT REACH THE CONTROL CABINET.
6. DETAIL "C" USED WHEN INSTALLING A NEW CAMERA ON A CLS POLE WHEN THE FACTORY PRE-TERMINATED CLS CABLE DOES NOT REACH THE CONTROL CABINET.

NO.	DATE	APPR.	REMARKS

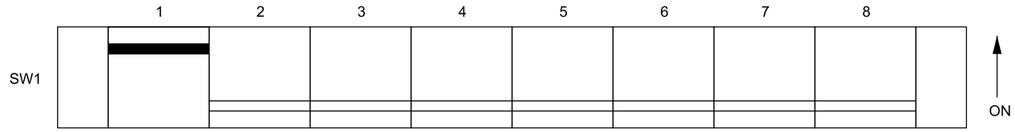
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — JAN. 10, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN. 10, 2017 DATE
DEPUTY DIRECTOR

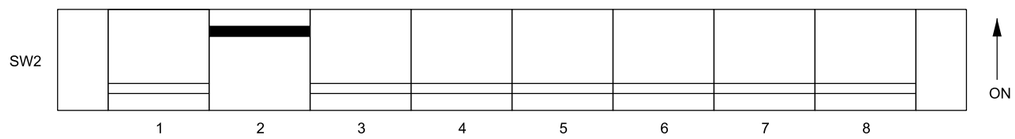
CAMERA CABLE
SPLICING DIAGRAMS
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 10D

SWITCH 1 IS USED FOR SETTING THE BAUD RATE

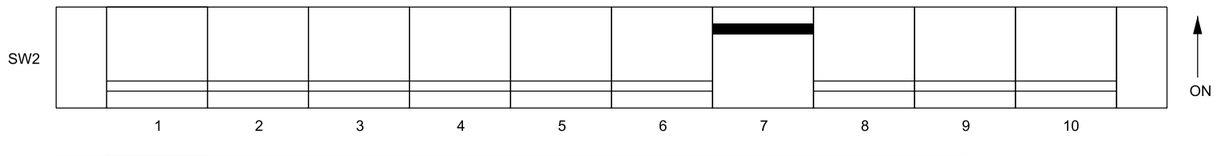


SWITCH 2 IS USED FOR SETTING THE ADDRESS

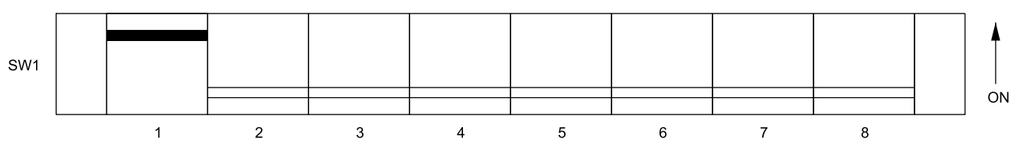


A POSITIONER CAMERA ES 30PC/ES 31PC (OLD)
DIP SWITCH SETTINGS (ESPRIT)

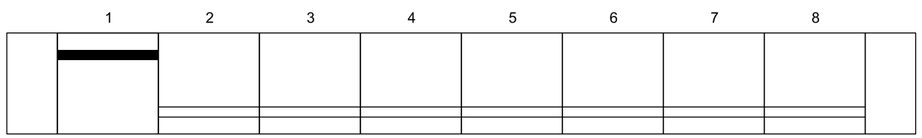
SWITCH 2 IS USED FOR SETTING THE BAUD RATE



SWITCH 1 IS USED FOR SETTING THE ADDRESS

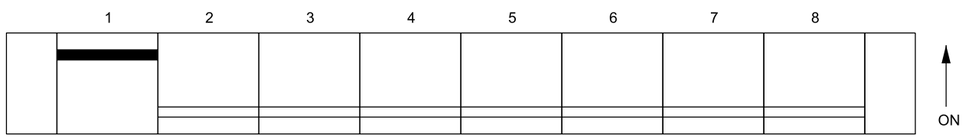


B POSITIONER CAMERA ES 40/ES 41 (NEW)
DIP SWITCH SETTINGS (ESPRIT)



SW1

SWITCH 1 IS USED FOR SETTING THE ADDRESS



SW2

SWITCH 2 IS USED FOR SETTING THE BAUD RATE

C DOME CAMERA
DIP SWITCH SETTINGS (VICON)

NOTES:

1. SET ESPRIT POWER SUPPLY TO 115 VAC. POWER SUPPLY LOCATED IN BASE OF CAMERA.

REVISIONS

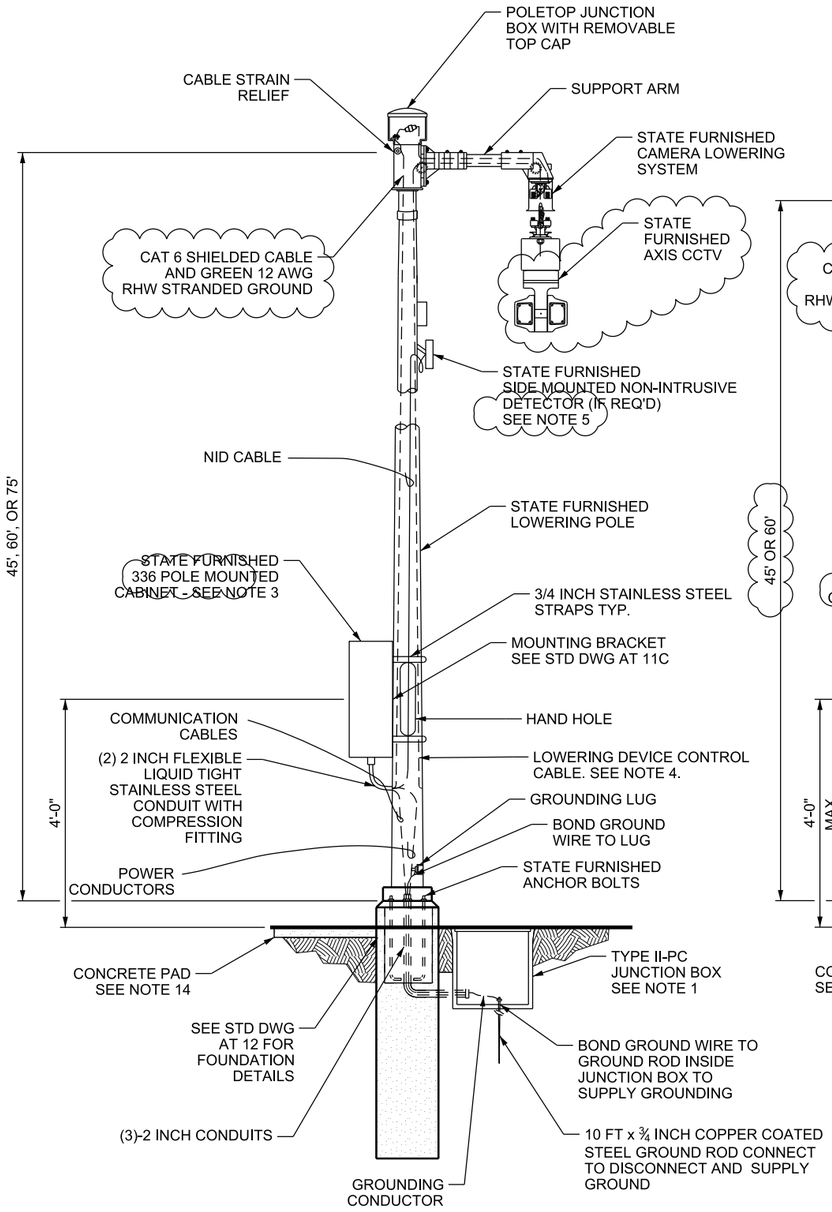
NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

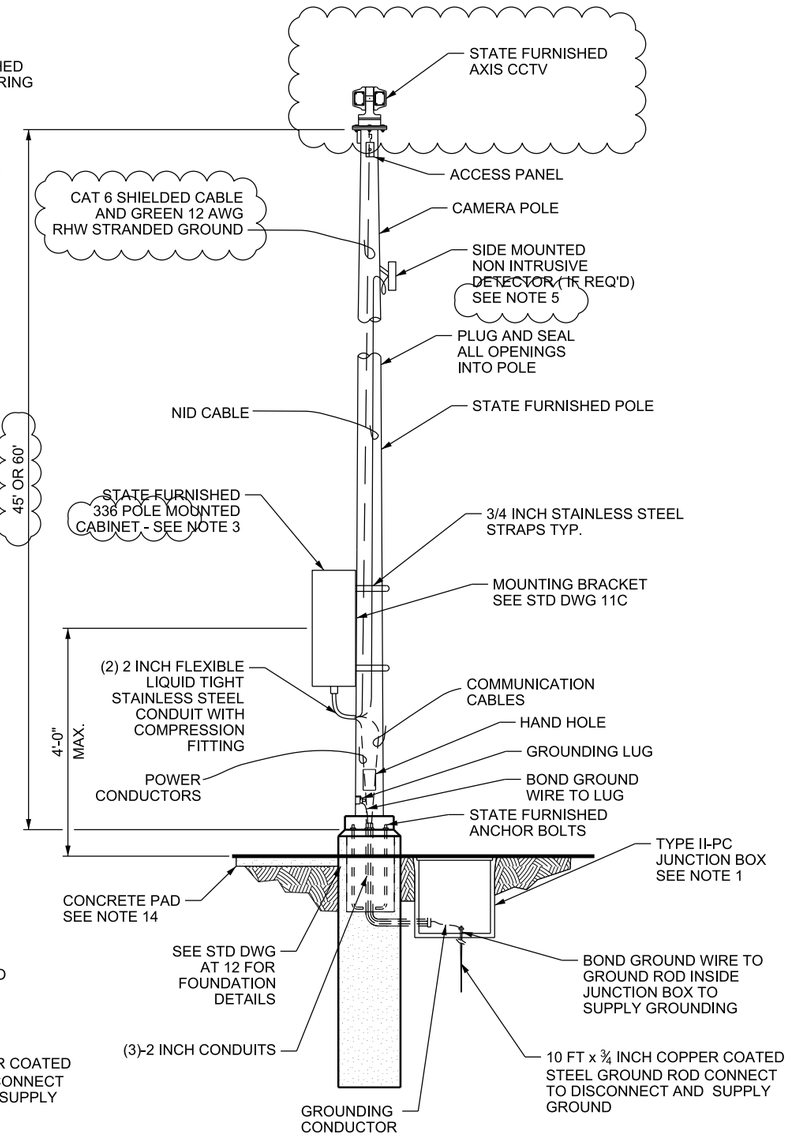
RECOMMENDED FOR APPROVAL — JAN. 01, 2017 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — JAN. 01, 2017 DATE
DEPUTY DIRECTOR — DATE

CCTV
DIP SWITCH SETTINGS
STANDARD DRAWING TITLE

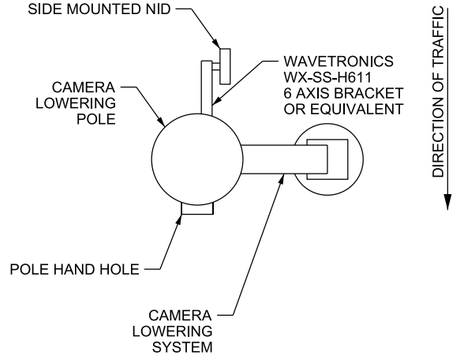
STD. DWG. NO.
AT 10E



A **CAMERA LOWERING POLE DETAIL**



B **NON-LOWERING CCTV POLE DETAIL**



C **CAMERA LOWERING POLE NID MOUNTING DETAIL TOP VIEW**

NOTES:

1. REFER TO STD DWG AT 7 FOR JUNCTION BOX DETAILS.
2. REFER TO STD DWG AT 10A AND 10B FOR CAMERA MOUNTING DETAILS.
3. USE POLE MOUNTED CABINET UNLESS PAD MOUNTED ATMS CABINET IS CALLED FOR ON PLANS.
4. LOWERING CABLE MUST NOT CONTACT ANY OTHER CABLE.
5. MOUNT NID TO NOT INTERFERE WITH CAMERA LOWERING OPERATION. MOUNT NID 30'-0" ABOVE GROUND SURFACE OR, AS SPECIFIED.
6. LOCATE POLE AT STATION AND OFFSET AS SHOWN.
7. CABINET MUST NOT INTERFERE WITH CAMERA LOWERING OPERATION.
8. ERECT CAMERA LOWERING POLE WITH HAND HOLE ON DOWN STREAM TRAFFIC SIDE OF POLE.
9. DO NOT INSTALL CAMERA LOWERING SYSTEM OR NID ON SAME SIDE OF POLE AS HAND HOLE.
10. ALL CONDUIT ENTRY MUST BE THROUGH BOTTOM OF CABINET.
11. ALL FLEXIBLE STEEL CONDUIT MUST BE INTENDED FOR OUTDOOR APPLICATION.
12. SEE STD DWG AT 11C FOR CABINET POLE MOUNTING DETAILS.
13. REFER TO STANDARD SPECIFICATION 16530 FOR GROUNDING REQUIREMENTS.
14. PROVIDE AN 8 FT LONG X 3 FT WIDE X 4 INCH DEEP CONCRETE PAD, CENTERED UNDER THE MODEL 336 STATE FURNISHED POLE MOUNTED CABINET.

SUPPLEMENTAL DRAWING

NO.	DATE	APPR.	REMARKS
1	8/29/19	MMA	REPLACED POSITION CAMERA WITH AXIS. ADDED CAT6 CABLE TO DETAILS.

UTAH DEPARTMENT OF TRANSPORTATION
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RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE — DEPUTY DIRECTOR

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

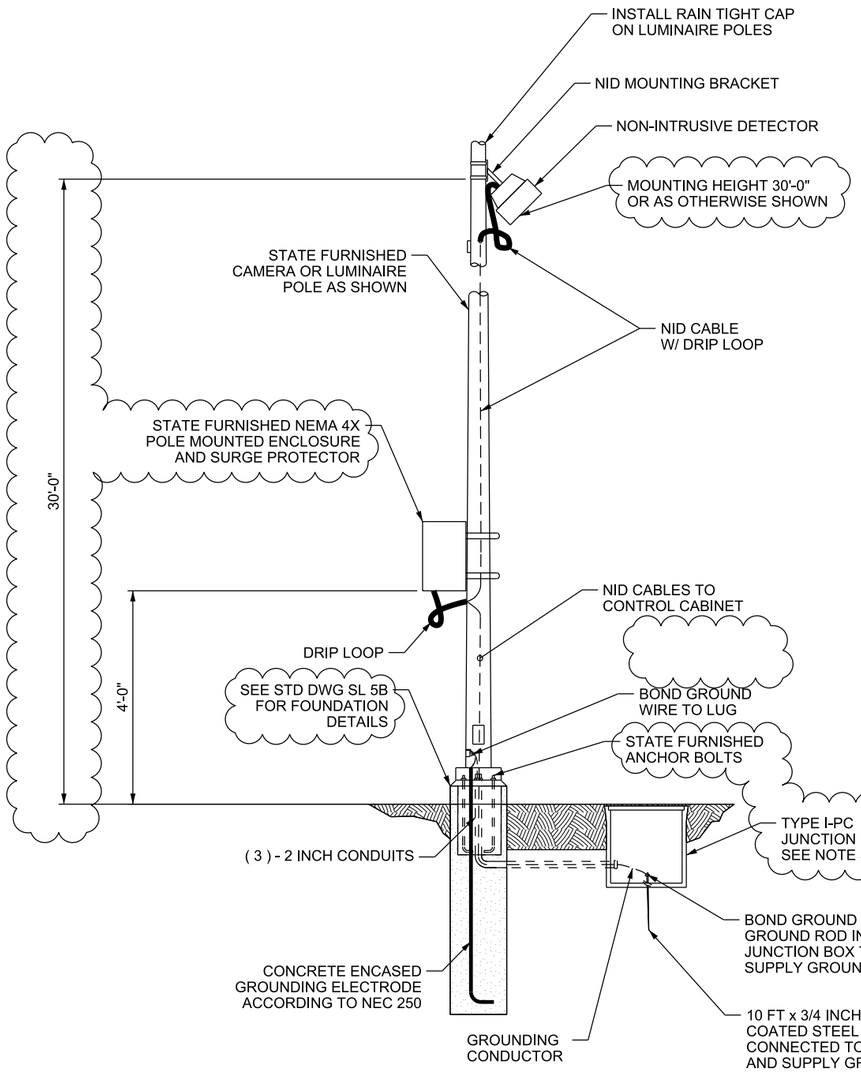
CCTV POLE MOUNTING DETAILS

STANDARD DRAWING TITLE

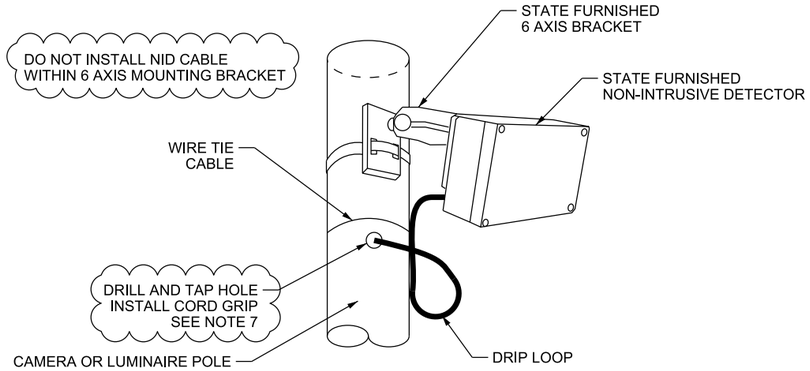
STD. DWG. NO.

AT 11A

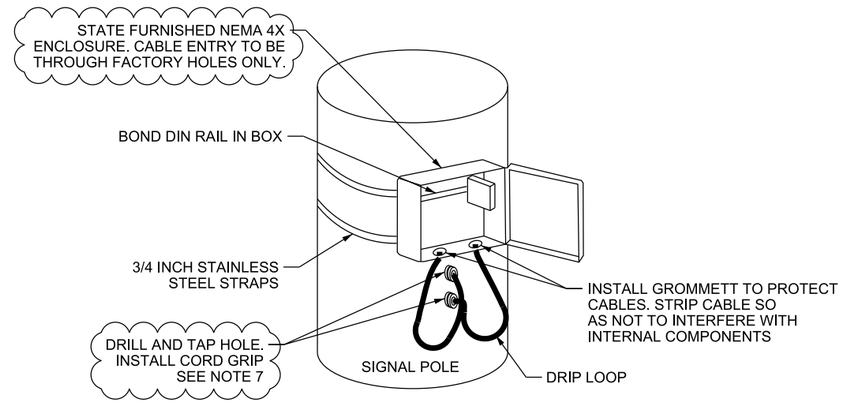
08-AUG-2019 DGN File: D:\Standardsand\SpecSection\Standards Committee\MeetingFiles\2019\5-August 29, 2019\Incoming\ATMS- Mike Adams\3-AgendaVersion\AT11A.dgn



A NID MOUNTING DETAIL NON-LOWERING AND LUMINAIRE POLES



B NID MOUNT ASSEMBLY DETAILS NON-LOWERING AND LUMINAIRE POLES



C POLE MOUNT ENCLOSURE DETAILS CABLE ENTRY THROUGH BOTTOM

NOTES:

1. STATION POLE NO MORE THAN 240 FT PERPENDICULAR DISTANCE TO FARTHEST EDGE OF PAVEMENT.
2. LOCATE POLE AT STATION AND OFFSET AS SHOWN.
3. REFER TO STD DWG AT 7 FOR JUNCTION BOX DETAILS.
4. USE TYPE I PC JUNCTION BOX ON POLES USING NEMA 4X BOX. USE TYPE II PC JUNCTION BOX ON POLES USING NEMA 3S OR 336 POLE MOUNTED CABINETS.
5. REFER TO STD DWG SL 5B, SL 5C, AND SL 5D FOR LUMINAIRE POLE DETAILS.
6. REFER TO STD DWG AT 11A AND AT 12 FOR CCTV POLE DETAILS.
7. SUPPLY AND INSTALL CORD CONNECTOR SIZED APPROPRIATELY FOR WIRE. USE THOMAS AND BETTS, REMKE OR, HUBBELL SHC1023 CORD CONNECTORS.
8. USE SIDE MOUNT NID BRACKET ON CAMERA LOWERING POLE. DO NOT MOUNT NID DIRECTLY ABOVE HAND HOLE OR IN THE CAMERA LOWERING PATH.
9. PLACE CABLES INTO POLE MOUNT NEMA 4X ENCLOSURE THROUGH BOTTOM ONLY. DO NOT DRILL HOLES IN BACK OF ENCLOSURE.
10. REFER TO STANDARD SPECIFICATION 16530 FOR CONCRETE ENCASED ELECTRODE REQUIREMENTS.
11. USE EPOXY SPLICE KIT IF DROP CABLE IS TOO SHORT TO REACH CONTROL CABINET. Ssplice NID CABLE IN JUNCTION BOX, LEAVE 6 FT OF SLACK NEATLY STORED IN JUNCTION BOX.
12. INSTALL NEMA 4X ENCLOSURE AND CLICK 200 SURGE PROTECTOR WHEN CONTROL CABINET IS ACROSS THE ROADWAY FROM NID POLE.

SUPPLEMENTAL DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MMA	REVISED MOST OF DRAWING TO REFLECT NEW EQUIPMENT

UTAH DEPARTMENT OF TRANSPORTATION
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RECOMMENDED FOR APPROVAL — AUG. 29, 2019 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUG. 29, 2019 — DATE

DEPUTY DIRECTOR

NON-INTRUSIVE DETECTOR MOUNTING DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
AT 11B

Action Item Update for August 29, 2019 Standards Committee Meeting

Regular Action Items.

- Discussion Group for removal of design information from Standard Drawings. Group has been formed and meeting. Ongoing effort to removed design information from Standards Drawings. **(Ongoing)**

Current Assignments for the 2017 Standards:

Brad Yeates (Standards and Design)

- Update this list as required **(Ongoing)**

Closed Assignments

None

End of Agenda Package